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THE WORLD'S
EXCHANGES

IN

1898

BY

JOHN HENRY NORMAN

December, 1898

A RECKONER OF FOREIGN AND
COLONIAL EXCHANGES

A
RECKONER

OF THE
FOREIGN & COLONIAL EXCHANGES

BETWEEN
SEVEN CURRENCY INTERMEDIARIES
FOR THE
TRAVELLER, TRADER, AND FINANCIER

*The Principles and Practice of Money brought within the
range of Pupils at Secondary and Continuation Schools.*

BY
JOHN HENRY NORMAN

MEMBER OF THE LONDON CHAMBER OF COMMERCE, EXPERT IN THE SCIENCE
OF AND PRACTICE WITH MONEY, AUTHOR OF "THE UNIVERSAL CAMBIST"
OF 1897, TO WHICH THIS PAMPHLET IS AN USEFUL ADDENDA.

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PREFACE.

I EARNESTLY invite the most serious attention, with unbiassed mind, of every one—especially rulers, statesmen, legislators, and economists—to this analysis of the world's prices and foreign and colonial exchanges of intermediaries; and to the simple arithmetical demonstration to travellers, traders, and financiers of their effects upon the interchanges of things between man and man and community and community.

Sound bases for the construction of monetary systems cannot be expected from those who are totally ignorant of the knowledge possessed both theoretically and practically by the magnates of the money power of the world. Striking evidence of this can be seen in the first 8393 questions put to and answered by twenty-five examinees, of whom ten were either past or present servants of the State, nine were traders and producers, and six were financiers and bankers, before the India Office Committee upon schemes for providing an effective metal monetary system for British India.

Lord Rothschild's evidence, under 133 interrogatories before this Committee, of what financiers have done and can do, of what Governments can and cannot do, and what British India's trade could possibly do or not do, with the absolute requisite of what it must do to provide and keep an effective gold standard, are a few scientific truths among the evidence given under the remaining 8260 questions in the first blue book of 319 pages.

I repeat the suggestion with which I closed my pamphlet upon "British India's Future Standard Currency":—"Whether it is not a pressing need on every one who has the mind for it, especially statesmen and legislators, to do their utmost to probe to the bottom and discover a sound foundation for the world's interchanges of things, and a corrective to the injustice arising from the machinery at present in use?"

22, Lee Terrace, S.E.

December 2nd, 1898.

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THEORY AND PRACTICE OF THE CHAIN RULE

COMPOUND arbitration or compound proportion, called the chain rule, which has existed from the time of Euclid, is better known and more widely practised on the Continent of Europe than in the British Isles.

It is particularly valuable in the exchanges of currency intermediaries, and highly serviceable in calculations of the exchanges of other things, especially where currency intermediaries form a part of the equations. Facility of use of the chain rule depends on a quick discernment of the accurate formation of the chain to arrive at a true result of the given problem.

The statement of the problem consists of two columns. The first line of the two columns states the question to be answered, the second line must begin with the same description of thing as the first ends with, and so on.

Let us analyze the following problem :—

The expense of supplying 2780 street lamps with oil amounted in eight months to 6800 dollars, the cost of the oil was 12 dollars per cwt. ; what will be the expense of 4777 lamps for $7\frac{1}{2}$ months in British money, the oil being at a cost of 20 dollars per cwt.? The British pound is 113·0016 grains of gold, the American dollar is 23·22 grains of gold.

The question is what is the cost of oil in British pounds for 4777 lamps under given conditions.

The first line therefore is,—

$$? \text{ (pounds) } = 4777 \text{ lamps ;}$$

the second is the number of lamps for which 6800 dollars is paid,—

$$\text{lamps } 2780 = 6800 \text{ dollars ;}$$

THE CHAIN RULE

the third is the dollars paid for the first purchase of oil,—
dollars 12 = 1 cwt.;

the fourth is the second price in dollars for a cwt. of oil,—
cwt. 1 = 20 dollars;

the fifth is the conversion of dollars into pounds,—
pound grains of gold 113·0016 = 23·22 grains of gold, dollar;

the sixth is the two periods 8 months and $7\frac{1}{2}$ months,—
months 8 = 7·5

The fifth equation might with equal accuracy be,—

$$\text{Dollars } 4\cdot8665 = 1 \text{ £}$$

It would give the true chain sequence, but would hide the weights.

To arrive at the answer the multiplication of the figures in the left hand column forms the divisor, the multiplication of the right hand figures forms the dividend, the quotient is the answer. Since the cost of the oil for eight months is given in dollars, the $7\frac{1}{2}$ months will figure in the right hand column and eight months in the left hand column.

The following is the statement of the chain :—

$$\begin{array}{rcl}
 \text{? (pounds)} & = & 4777 \text{ lamps} \\
 \text{lamps } 2780 & = & 6800 \text{ dollars} \\
 \text{dollars } 12 & = & 1 \text{ cwt.} \\
 \text{cwt. } 1 & = & 20 \text{ dollars} \\
 \text{grains of gold } 113\cdot0016 & = & 23\cdot22 \text{ grains of gold} \\
 \text{months } 8 & = & 7\cdot5 \text{ months}
 \end{array}$$

$$\begin{array}{r}
 425 \\
 \cancel{888} \quad 1 \\
 \cancel{1788} \quad \cancel{8} \quad 11\cdot61 \quad 2\cdot5 \\
 \hline
 4777 \times \cancel{6800} \times 1 \times \cancel{12} \times \cancel{20} \times 23\cdot22 \times 7\cdot5 = \text{£}3751\cdot60 \\
 \hline
 2780 \times 12 \times 1 \times \cancel{113\cdot0016} \times \cancel{23} \times \cancel{8} \\
 \quad \quad \quad 56\cdot5008 \quad \cancel{1}
 \end{array}$$

“The Elements of Arithmetic,” by P. Ghosh, in use in Indian schools and colleges, reached a twelfth edition in 1888. In this work the chain rule is made much of.

Schönberg’s chain rule in English is a useful little tract, and can be obtained at Messrs. Effingham Wilson & Co.’s, Royal Exchange, for one shilling. It is the only entry upon the subject under the head of “Arithmetic” in the British Museum catalogue.

THE MECHANISM OF THE WORLD'S PRESENT PRICES, AND OF THE FOREIGN AND COLONIAL EXCHANGES OF INTERMEDIARIES.

I hope my exposition may justify the title which I have given to this most important sociological question. There are divers local prices of things. In the interest of backward countries, calico, tea, or other substances, are used as intermediaries to facilitate the interchanges of things, and the substance thus used does the work of money as an equivalent—not as a token—in the exchange. Barter is the direct exchange of one thing for another. No intermediary is used in barter. All economists admit that barter is, or should be, the basis of all interchanges of things. My purpose is to prove by very simple arithmetical formula (1) that if the world possessed but one substance as its measure of value and equivalent in exchange, the world's interchanges of things could be effected on the conditions of barter. (2) That there are in the trading world at the present time seven different monetary and currency intermediaries, five of which are of a vastly different nature. (3) That these seven different intermediaries produce forty-two different prices of intermediaries, some of which either confer a bounty or impose a tax in international or intercolonial interchanges of things, resulting in the unfair encouragement of production of things in some countries and the handicapping of industries in other countries to an extent which can be measured by heavy percentages.

In 1887 I was privileged to address a meeting under the auspices of the London Institute of Bankers at the London Institution upon the metallic bases of the colonial and foreign exchanges and the simplification of exchange. The chairman of the meeting was at that time a well-known successful manager of an Eastern Exchange Bank. In the course of his remarks at the close of the lecture he said, "As regards the question of the knowledge of the young men of this country with respect to exchanges, I think that those among us who have been accustomed to visit foreign lands, and have conversed with merchants on the Continent, must acknowledge that the

business men of France and Germany are far better trained in this special branch than we are. I would impress upon all those present this evening the great advantage of being able to calculate by the chain rule; a man accustomed to that branch of arithmetical calculation can quickly work out intricate problems, not only in exchanges, but also where the sale and purchase of produce is concerned."

Some years ago now it was confidently asserted that within ten years of the commencement of the teaching of the subject in the simple manner it can be taught in the schools of the world, the utmost astonishment would be expressed at the ignorance in which the human mind is sunk upon the subject of money and the mechanism of the interchanges of things between man and man, and community and community.

It is with the view to open out truth upon these most important subjects, more than has been done in my "Universal Cambist," that this pamphlet has been written. It appears in the same year as Messrs. C. Pendlebury and W. S. Beard have produced their book upon Commercial Arithmetic. Eighteen pages of this book are given to examples and questions upon monetary systems and exchange. On page 127 will be found—

"146. The following is a more complicated example of a kind which is often met with in business transactions.

Example. Express 15 francs per kilogramme in pence per lb., assuming that francs 25·1 = £1, and 1 kilog. = 2·2 lb.—

$$\begin{aligned}
 \text{The cost of 1 kilog.} &= 15 \text{ francs} \\
 \therefore 2\cdot2 \text{ lb.} &= 15 \text{ francs} \\
 \therefore 2\cdot2 \text{ lb.} &= \frac{15 \times 240}{25\cdot1} \text{ pence} \\
 \therefore 1 \text{ lb.} &= \frac{15 \times 240}{25\cdot1 \times 2\cdot2} \text{ pence} \\
 &= \frac{1,800}{27\cdot61} \text{ pence} \\
 &= 65 \text{ pence nearly} \\
 &= 5s. 5d."
 \end{aligned}$$

By the chain rule. The statement and sum are—

$$\begin{aligned}
 ? \text{ (pence)} &= 1 \text{ lb.} \\
 \text{lb. } 2\cdot2 &= 1 \text{ kilog.} \\
 \text{kilog. } 1 &= 15 \text{ francs} \\
 \text{francs } 25\cdot1 &= 240 \text{ pence}
 \end{aligned}$$

$$\frac{1 \times 1 \times \overset{3}{\cancel{28}} \times \overset{120}{\cancel{240}}}{\overset{\cancel{28}}{1.1} \times 1 \times \overset{\cancel{28}}{5.02}} = 65.1938 \text{ pence being } .0063 \text{ more than } 65\frac{3}{4} \text{ pence.}—$$

[Ans.]

On page 206 there is another example—

“Example i. If the exchange between London and Amsterdam be 36 shillings Flemish per £ and between Paris and Amsterdam 2 fr. per 3s. Flemish, how much must be remitted to Paris by way of Amsterdam to pay a debt of 20,000 fr.? Find also the rate of exchange between London and Paris.

We have—

$$\begin{aligned} 1 \text{ franc} &= \frac{2}{3} \text{ s. Flemish} \\ 1 \text{ s. Flemish} &= \frac{1}{3.6} \text{ £ sterling} \\ \therefore 20,000 \text{ francs} &= 20,000 \times \frac{2}{3} \text{ s. Flemish} \\ &= 20,000 \times \frac{2}{3} \times \frac{1}{3.6} \text{ £} \\ &= \underline{\underline{£2500}} \\ &= \underline{\underline{£833 \text{ } 6\text{s. } 8\text{d.}}} \\ \therefore \text{sums sent to Amsterdam} &= \underline{\underline{£833 \text{ } 6\text{s. } 8\text{d.}}} \end{aligned}$$

Again—

$$\begin{aligned} \text{£1 sterling} &= 36 \text{ Flemish} \\ &= 36\frac{2}{3} \text{ francs} \\ &= 24 \text{ francs} \end{aligned}$$

∴ rate of exchange between London and Paris is given by £1 sterling = 24 francs.”

By the chain rule. The statements and sums are—

$$\begin{aligned} (1) \quad ? \text{ (pounds)} &= 20,000 \text{ francs} \\ \text{francs } 2 &= 3 \text{ shillings} \\ \text{shillings } 36 &= \text{£1} \end{aligned}$$

$$\frac{10,000 \quad 1}{\cancel{20,000} \times \cancel{3} \times 1} = \underline{\underline{£833.333 \text{ or } £833 \text{ } 6\text{s. } 8\text{d.}}}—\text{Ans.}$$

$$\begin{aligned} (2) \quad ? \text{ (francs)} &= \text{£1} \\ \text{£1} &= 36 \text{ shillings} \\ \text{shillings } 3 &= 2 \text{ francs} \end{aligned}$$

$$\frac{1 \times \overset{12}{\cancel{36}} \times 2}{1 \times \overset{\cancel{36}}{1}} = 24 \text{ francs.}—\text{Ans.}$$

I observe with great satisfaction that among weights, &c., at the beginning of the book a page is given to the mint issue weights of pure metal in troy grains for fourteen chief gold standard moneys of account, and for eight chief silver coins.

It would not be too much for children to learn these to the second decimal point. I do hope that the chain rule will be the vehicle for instruction upon money for the traveller, the merchant, and the financier.

It may be permissible to introduce the following from my "Universal Cambist":—

"Purchase and Sale of Things in Combination with the Exchange of Intermediaries.—It should be no difficult matter to one who is accustomed to instruct children to practise them in the interchanges of things between countries using the five great diverse intermediaries, namely, pure gold, pure silver, silver-cum-counter charge, inconvertible paper based on gold, inconvertible paper based on silver. For instance, as one method, get five bags made, one labelled British Isles; in this place a miniature bale of piece goods, and counters to represent grains of gold. Another bag labelled China, in this place a miniature hank of silk and counters to represent taels and cash. Another labelled British India, with a miniature chest of tea and counters to represent fictitious rupees. Another labelled Argentine Republic, with a miniature bag of wheat and paper to represent pesos based on gold. Another bag labelled Columbia, U.S., with a miniature bag of coffee and paper to represent sols based on silver. Taking from the commercial intelligence in the daily papers the prices of goods and the ratios of the day existing between the five intermediaries used in these countries, and applying them to the purchase in one country, and the sale in another of small quantities of the five descriptions of goods mentioned, the combined working of prices and rates of exchange of the five intermediaries could be taught, and should be mastered by youths before they go out into the world."

"The teacher will make himself master of Chapter VI. on the scientific mode of working the foreign and colonial exchanges of the world's present seven intermediaries. We will suppose that the teacher is thoroughly practised in all that this book is intended to impart. Doubtless each will have a method of teaching the mechanism of the interchanges of things, prices, and the money and currency exchanges of intermediaries.

Perhaps the writer may be permitted to indicate the steps that he thinks it may be expedient to take. I. Tear away monetary signs, and expose the things signified. These things are simply either a weight of gold, or a weight of silver as the bases of each of the seven intermediaries. This has been well done by Miss Sharland in her 'Coin of the Realm, What is it?' and children have demonstrated that they can understand and practise it. II. Assume that the whole world has only one substance as its measure of value and ultimate means of payment, also that the whole world has only one measure of weight, say the metric. Prices throughout the whole world would be more or less metric weight of gold. A rate of exchange would be more or less metric weight of gold, and the fluctuation limited to 1 per cent. on the weight exchanged. International prices for the same classes and qualities of things would be seen and measured at a glance. International and intercolonial exchanges of one intermediary would be as easy of comparison. The mind readily perceives that should this great desideratum ever be accomplished, the imputed mysteries about money, prices, and the foreign and colonial exchanges of intermediaries will have vanished like fog before a strong wind. III. The next step in instruction is to show that there is no mystery about these three things, although the world has seven monetary and currency intermediaries, entailing seven different descriptions of prices, and forty-nine different descriptions of exchanges of the seven intermediaries. Pupils must become familiar with the mode of dealing with each intermediary theoretically and practically. The science of and practice with money may possibly in the distant future centre in and around metric weights of pure gold. At present it centres in twenty-five different weights of pure gold and silver, each clothed with confusing monetary signs, and five of the seven intermediaries associated with and smothered by coinage charges, counters, or inconvertible paper, the creation of legislation."

The bases of my "Universal Cambist" are presented in the accompanying tables. I believe the simplest and clearest method of working all problems connected with money upon my system, is by the chain rule. If this is generally acquiesced in,

“TIMES” QUOTATIONS ON LONDON

this little pamphlet presents a progression upon my previous teaching which I earnestly hope may hasten the time when all youths leaving the school for the world will have imbibed all the instruction useful to them which my writings are intended to impart.

THE SCIENTIFIC MANNER OF QUOTING AND WORKING THE WORLD'S FOREIGN AND COLONIAL EXCHANGES OF INTERMEDIARIES.

In the *Times* of October 18th the following appears :—

Exchange on London at date October 14th, 1898.

Paris cheques	25 f. 32 c.
Brussels „	25 f. 35½ c.
Berlin sight	20 m. 45 pf.
Vienna „	12 fl. 04
Amsterdam „	12 fl. 12
Italy „	27 lire 49
Madrid „	38 ps. 10
Lisbon „	36½ <i>d.</i> nom.
St. Petersburg, 3 mos. ..	93 r. 75
Bombay, T. T. . . .	1s. 3¼ <i>d.</i>
Calcutta „	1s. 3¼ <i>d.</i>
Hong Kong, 4 mos. ..	1s. 11 <i>d.</i>
Shanghai, T. T. . . .	2s. 7⅞ <i>d.</i>
Yokohama, 4 mos. ..	2s. 0½ <i>d.</i>
Rio de Janeiro . . .	8¼ <i>d.</i>
Valparaiso, 90 days ..	13¼ <i>d.</i>
Buenos Ayres paper dol. ..	18·97 <i>d.</i>
„ gold pii. ..	151 p. c.

The above are seventeen quotations of exchange from nine European countries, three South American countries, and five from four Eastern countries on London. The quotations for eight European countries are in the currency of each of those countries for the British pound; the remaining one is in pence for a milrei. All the rest are in pence for the standard unit currency of each country. The three South American ones are inconvertible paper based on gold for pence. The two Indian ones, silver-cum-counter charge—i.e. fictitious rupee—for pence. The three remaining Eastern ones are automatic silver for pence. Eight of the nine European quotations are scientific; all the rest are not so. These eight are scientific because it is a variable rate in the country originating the

TABLE I.

Mint-issue weight of pure gold and pure silver in the world's immediate past,^a present, and prospective^b chief moneys of account. Col. I.—Chief country using the money of account. II.—Name of money of account and weight of pure metal in decigrams. III.—Name and weight indicated by tokens. IV.—Name and weight indicated by a minute portion of each chief money of account. V.—Monetary signs for one decigram. VI.—Constants for ascertaining the ratio between gold and silver. The constants in the gold table must be divided by the price of silver of the day to give the ratio. The constants in the silver table must be used as a divisor of the silver price of gold of the day, and the answer will be the ratio.

GOLD.

I.	II.	III.	IV.	V.	VI.
	Decigrams.	Decigrams.	Decigrams.		
I. Egyptian	pound 74.375	piastre .. $\frac{1}{100}$.744 ochr .. $\frac{1}{1600}$.074	och-el-gnerches $\frac{1}{16}$.0046	13.44 och-el-gnerches	629.24936 och-el-gnerches
II. British	" 73.224	shilling .. $\frac{1}{20}$ 3.66 penny .. $\frac{1}{240}$.305	penny .. $\frac{1}{100}$.0047	3.28 pence ..	942.9955 pence
III. Turkish	" 66.146	piastre .. $\frac{1}{100}$.66 para .. $\frac{1}{1000}$.016	para .. $\frac{1}{4}$.0041	60.47 paras ..	4841.6490 piastres
IV. Portuguese	milrei 16.257	testoon .. $\frac{1}{100}$.16 rei .. $\frac{1}{1000}$.016	rei .. $\frac{1}{4}$.0041	61.51 reis ..	615.11646 milreis
V. Uruguayan	peso 15.56	centesimo .. $\frac{1}{100}$.155	centesimo .. $\frac{1}{32}$.0030	6.43 centesimos ..	642.61198 pesos
VI. United States, N.A. ..	dollar 15.046	cent .. $\frac{1}{100}$.15	cent .. $\frac{1}{100}$.0047	6.65 cents ..	2067.1834 cents
VII. Argentina	peso 14.516	centavo .. $\frac{1}{100}$.145	centavo .. $\frac{1}{100}$.0045	6.89 centavos ..	688.8888 pesos
VIII. Brazilian	milrei 8.218	10 reis .. $\frac{1}{100}$.082 1 rei .. $\frac{1}{1000}$.0082	rei .. $\frac{1}{2}$.0041	121.69 reis ..	1216.8733 milreis
IX. Russian	rouble, old ^a 11.61 " new 7.74	kopec .. $\frac{1}{100}$.116 " .. $\frac{1}{100}$.077	kopec .. $\frac{1}{100}$.00725 " .. $\frac{1}{100}$.0048	8.61 kopecks ..	367.367 kopecks
X. Japanese	yen, old ^a 15.00 " new 7.5	sen .. $\frac{1}{100}$.15 " .. $\frac{1}{100}$.075	sen .. $\frac{1}{100}$.00936 " .. $\frac{1}{100}$.00468	12.92 " ..	551.05095 " "
XI. Dutch	guilder 6.05	cent .. $\frac{1}{100}$.0605	cent .. $\frac{1}{100}$.00378	6.66 sens ..	250. " "
XII. Chilean	peso, old ^a 13.72 condor, new 5.49	centavo .. $\frac{1}{100}$.137 " .. $\frac{1}{100}$.0549	centavo .. $\frac{1}{100}$.0085 " .. $\frac{1}{100}$.00343	13.33 " ..	500. " "
XIII. British Indian	rupee, old 7.127 " new ^b 4.88	anna $\frac{1}{16}$.594 pie $\frac{1}{16}$.037 " " .305 " " .025	pie .. $\frac{1}{16}$.0046 " .. $\frac{1}{16}$.0032	16.53 cents ..	1653.4391 guilders
XIV. Scandinavian	crown 4.03	ore .. $\frac{1}{100}$.0403	ore .. $\frac{1}{100}$.0050	7.28 centavos ..	728.454 pesos
XV. German	mark 3.584	pfennig .. $\frac{1}{100}$.0358	pfennig .. $\frac{1}{100}$.00448	18.21 " ..	1820.9026 condors
XVI. Austria-Hungarian ..	florin, old 7.258 crown, new ^b 3.049	krentzer .. $\frac{1}{100}$.0725 heller .. $\frac{1}{100}$.0304	krentzer .. $\frac{1}{100}$.0091 heller .. $\frac{1}{100}$.0038	2.24 annas ..	261.827 annas
XVII. France	franc 2.903	centime .. $\frac{1}{100}$.02903	centime .. $\frac{1}{100}$.0036	3.28 " ..	382.29546 " "

SILVER.

I.	II.	III.	IV.	V.	VI.
I. Chinese	tael* 334.62	10 cash .. $\frac{1}{100}$ 3.346 1 " .. $\frac{1}{1000}$.334	cash .. $\frac{1}{8}$.042	2.99 cash ..	1.1206023 tael
II. Trade	dollar† 244.94	cent .. $\frac{1}{100}$ 2.449	cent .. $\frac{1}{64}$.038	.41 cents ..	40.826 dollars (trade)
III. Mexican	peso* 244.41	centavo .. $\frac{1}{100}$ 2.444	centavo .. $\frac{1}{64}$.038	.41 centavos ..	40.914994 pesos
IV. Japanese	yen 242.61	sen .. $\frac{1}{100}$ 2.426	sen .. $\frac{1}{64}$.0379	.41 sen ..	15.457000 yens
V. Javanese	rix dollar* 236.25	cent .. $\frac{1}{100}$.945	cent .. $\frac{1}{100}$.0365	.42 cent ..	42.328443 rix dollars
VI. Philippines	dollar 233.64	" .. $\frac{1}{100}$ 2.336	" .. $\frac{1}{100}$.0365	.43 " ..	42.800906 dollars
VII. Columbian, U.S. ..	sol 225.00	centesimo .. $\frac{1}{100}$ 2.25	centesimo .. $\frac{1}{100}$.035	.44 centesimo ..	44.44444 sols
VIII. Bolivian	boliviano* 202.50	" .. $\frac{1}{100}$ 2.025	" .. $\frac{1}{100}$.0316	.49 " ..	49.382716 bolivianos
IX. Russian	rouble 179.96	kopec .. $\frac{1}{100}$ 1.80	kopec .. $\frac{1}{32}$.05	.55 kopeck ..	23.704185 kopecks
X. Siamese	tical* 146.64	phai-nung .. $\frac{1}{32}$ 4.58	solot .. $\frac{1}{32}$.036	.22 phai-nung ..	1.0428306 ticals
XI. Austria-Hungarian ..	florin 111.11	krentzer .. $\frac{1}{100}$ 1.11	krentzer .. $\frac{1}{100}$.0347	.9 krentzer ..	45. florins
XII. British India	rupee 106.92	pie .. $\frac{1}{100}$.556	pie .. $\frac{1}{100}$.0348	1.8 pies ..	1.0909090 rupee
XIII. Persian	kran* 41.43	shahis .. $\frac{1}{20}$ 2.07	dinar .. $\frac{1}{1000}$.0414	.48 shahis ..	1.111111 kran

† The coinage of this dollar has ceased.

The present operative silver moneys of account are marked with an asterisk (*).

TABLE II.

THE WORLD'S GOLD AND SILVER STANDARD MONETARY SYSTEMS IN THE WEIGHTS USED BY GREAT BRITAIN AND THE UNITED STATES OF NORTH AMERICA.

Col. I.—Name of chief country using the money of account. II.—Name of chief money of account. III.—Mint issue of gross and fine weights of metal in each chief money of account. IV. and V.—Weights of pure metal in each chief money of account. VI.—Monetary sign for one troy grain of

GOLD.

I.	II.	III.	IV.	V.	VI.
		Troy grains.	Troy grains.	Troy grains.	
I. Egypt	ponnd ..	131-17-4958	114-778088	piastre	1 ¹ / ₁₆ 1-15
II. British	" ..	123-27-4478	113-001605	ochr	1 ¹ / ₁₆ 1-11
III. Turkey	" ..	111-3598	102-079887	shilling	2 ¹ / ₁₆ 5-65
IV. Portugal	milrei ..	27-3905	25-088524	penny	2 ¹ / ₁₆ 1-47
V. Uruguay	peso ..	26-1887	24-015034	piastre	1 ¹ / ₁₆ 1-021
VI. United States ..	dollar ..	25-80	23-22	para	1 ¹ / ₁₆ 1-025
VII. Argentina	peso ..	24-8908	22-401743	testoon	1 ¹ / ₁₆ 1-25
VIII. Brazil	milrei ..	13-83487	12-681957	rei	1 ¹ / ₁₆ 1-025
IX. Russia	rouble new	13-273894	11-9465049	centesimo	1 ¹ / ₁₆ 1-24
X. Japan	" old	19-910817	17-919736	cent	1 ¹ / ₁₆ 1-232
XI. Holland	yen, new ..	12-8602964	11-574266	centavo	1 ¹ / ₁₆ 1-224
XII. Chili	" old ..	10-370542	9-33348	10 reis	1 ¹ / ₁₆ 1-126
XIII. British India ..	guilder ..	9-24557872	8-4751138	1 reis	1 ¹ / ₁₆ 1-012
XIV. Scandinavia ..	condor ..	23-5343	21-1809	kopeck	1 ¹ / ₁₆ 1-119
XV. Germany	peso, old ..	8-218312	7-53344	sen	1 ¹ / ₁₆ 1-115
XVI. Austria-Hungary	rupee, new	6-9141	6-22274277	cent	1 ¹ / ₁₆ 1-0933
XVII. France	" old ..	6-1458	5-53134	centavo	1 ¹ / ₁₆ 1-0847
	crown ..	5-2277616	4-7049864	anna ¹ / ₁₆ = 466 1 pie ¹ / ₁₆	1-039
	florin, old	12-446195	11-20157	ore	1 ¹ / ₁₆ 1-0622
	franc ..	4-978128	4-480359	pfennig	1 ¹ / ₁₆ 1-0553
				heller	1 ¹ / ₁₆ 1-0470
				centime	1 ¹ / ₁₆ 1-0448

SILVER.

I.	II.	III.	IV.	V.	VI.
		Troy grains.			
I. China	tael * ..	516-405842	Troy grains.	Troy grains.	
II. Trade	dollar ..	420	10 cash	cash	1-93646 cash
III. Mexico	peso * ..	417-7847	1 cash	1/8 00645	
IV. Japan	yen ..	416	cent	1/16 0590	2645 cent
V. Java	rix dollar *	385-80875	centavo	1/16 0589	26512 centavo
VI. Philippines	dollar ..	400-6253	sen	1/16 0585	26709 sen
VII. Columbia, U.S. . .	sol ..	385-86469	cent	1/16 0563	2743 cent
VIII. Bolivia	boliviano *	347-22783	1/16 0542	2880 "
IX. Russia	rouble ..	308-5806	centesimo	1/16 0488	3200 "
X. Siam	tiel ..	226-300908	kopeck	1/16 0867	36007 kopeck
XI. Austria-Hungary	florin ..	171-4708	phai-mung ..	1/16 055	1409 phai-mung
XII. British India ..	rupee ..	180-000	krentzer	1/16 0535	5830 krentzer
XIII. Persia	kram * ..	71-04	anna 1/16 = 10-31 pie	1/16 0537	11636 pies
		63-936	shahis	1/16 0490	3128 shahis

The present operative silver moneys of account are marked with an asterisk (*).

transaction for a fixed rate in the country operated upon. The British rate on each of these countries should be variable pence for each country's chief money of account. Each of the nine other quotations should be a variable quantity of each country's intermediary for the British pound. For instance, take the quotation in Yokohama, $24\frac{1}{2}$ pence: it should be 9.79 yens for one pound; thus—

$$240 \text{ pence} \div 24\frac{1}{2} = 9.79 \text{ yens.} \text{—Ans.}$$

The following Tables of fixed pars of exchange will be found of considerable use in determining the meaning of exchange quotations:—

Fixed pars of exchange are different countries' monetary signs for the same weight of the same pure metal.

TABLE III.
FIXED GOLD PARS.

Col. I. Name of country and chief money of account. Col. II. Each country's monetary sign for the weight of pure gold in the sovereign at mint issue weight. Col. III. British monetary sign for each chief gold money of account.

Col. I.	Col. II.	Col. III.
I. Egypt, pound ..	98.45 piastres	243.773 pence = £1 0s. 3 $\frac{3}{4}$ d.
II. Turkey, " ..	112.44 "	216.804 " = 18s. 0 $\frac{1}{6}$ d.
III. Portugal, milrei ..	4.57 milreis	53.278 "
IV. Uruguay, peso ..	4.78 pesos	51.005 "
V. U.S.A., dollar ..	4.866 dollars	49.315 "
VI. Argentine, peso ..	5.123 pesos	47.578 "
VII. Brazil, milrei ..	8.91 milreis	26.935 "
VIII. Russia, rouble ..	9.46 roubles	25.373 "
IX. Japan, yen ..	9.76 yens	24.582 "
X. Holland, guilder..	12.11 florins	19.823 "
XI. Chili, condor ..	13.33 condors	17.997 "
XII. Brit. India, rupee	15 rupees	16 "
XIII. Scandinavia, crown	18.16 crowns	13.216 "
XIV. Germany, mark ..	20.43 marks	11.747 "
XV. Austria, crown ..	24.02 crowns	9.992 "
XVI. France, franc ..	25.22 francs	9.515 "

In presenting fixed silver pars of exchange as they existed before 1873, it is possible that in more than one instance they may become operative in the future.

FIXED SILVER PARS

TABLE IV.

FIXED SILVER PARS.

Col. I. Name of country and chief money of account. Col. II. Each country's monetary sign for the weight of pure silver in the British Indian rupee at mint issue weight. Col. III. British Indian monetary sign for each chief silver money of account.

Col. I.	Col. II.	Col. III.
I. China, tael	319·5 cash	50·075 annas.
II. Mexico, dollar or peso .. .	43·74 centavos	36·575 "
III. Japan, yen	44·07 sens	36·305 "
IV. Java, rix dollar	45·25 cents	35·353 "
V. Philippines, dollar	45·76 "	34·963 "
VI. Columbia, U.S., sol	47·52 centesimos	33·670 "
VII. Bolivia, boliviano	52·80 "	30·303 "
VIII. Russia, rouble	59·41 copecks	26·930 "
IX. Siam, tical	23·32 phai-nungs	21·945 "
X. Austria, florin	96·22 krentzers	16·627 "
XI. Persia, kran	2·58 krans	6·190 "

TABLE V.

GOLD FOR SILVER.

Col. I. Name of silver system. Col. II. Constant attached. Col. III. British par price of each silver money of account at a ratio of 33·31 parts of silver to 1 part of gold.

Col. I.	Col. II.	Col. III.
I. China	1096·773	32·92 <i>d.</i>
II. Mexico	801·081	24·05 <i>d.</i>
III. Japan	795·172	23·87 <i>d.</i>
IV. Java	774·338	23·24 <i>d.</i>
V. Philippines	765·782	22·99 <i>d.</i>
VI. Columbia, U.S.	737·465	22·14 <i>d.</i>
VII. Bolivia	663·717	19·93 <i>d.</i>
VIII. Russia	589·843	17·70 <i>d.</i>
IX. Siam	480·648	14·43 <i>d.</i>
X. Austria	364·181	10·96 <i>d.</i>
XI. British India	350·437	10·52 <i>d.</i>
XII. Persia	135·791	4·07 <i>d.</i>

As an instance of absolute metal pars, silver for gold, take the British Indian silver rupee price of each of the world's sixteen chief gold moneys of account at the ratio of 33·31 of silver to 1 part of gold.

TABLE VI.
SILVER FOR GOLD.

Col. I. Name of gold system. Col. II. Constant attached in decimals of a rupee. Col. III. Price in rupees or annas obtained by multiplying the constant by the ratio, which is taken at 33'31.

Col. I.	Col. II.	Col. III.
I. Egypt	·69563	23·17 rupees.
II. Britain	·68458	22·81 ..
III. Turkey	·61866	20·61 ..
IV. Portugal	·15205	5·06 ..
V. Uruguay	·145546	3·85 ..
VI. U.S.A.	·140727	4·68 ..
VII. Argentina	·135768	4·52 ..
VIII. Brazil	·076861	2·56 ..
IX. Russia	·072403	2·41 ..
X. Japan	·071471	2·38 ..
XI. Holland	·056566	1·88 ..
XII. Chili	·051364	1·71 ..
XIII. Scandinavia	·037713	1·26 ..
XIV. Germany	·033523	1·10 ..
XV. Austria	·028515	15·19 annas.
XVI. France	·027154	14·47 ..

The chief factor in each of the world's seven present monetary and currency intermediaries is weight : a weight of gold or a weight of silver in each of twenty-five chief moneys of account on issue of the world's respective chief current coins from the mints ; also the weight of pure metal indicated by tokens composing each chief money of account, as the penny the 240th of a pound, 1 centime the 100th of a franc. Table I. presents these weights in decigrams ; Table II. in troy grains. Besides these weights, each table presents a most valuable and important factor in the monetary sign in each system for 1 decigram or 1 grain of pure metal. The third most necessary and potent factor is the constant attached to each system in Col. VI. of Table I., by the use of which the daily fluctuating ratio between gold and silver can be easily determined.

The monetary sign for 1 decigram or 1 troy grain of pure metal is of high value in use in two directions : as a divisor and as a multiplier. As a divisor it determines the weight

indicated by a monetary sign. As a multiplier it confers a monetary sign upon a given weight.

I. As a divisor: rates from the *Times*, October 18th, 1898. Exchanges on London.

(a) Paris cheques 25 f. 32 c. What does this mean?

On Table II. the monetary sign for 1 grain of gold attached to France is 22·3196 centimes (100 centimes in a franc). The sum is—

$$25\cdot32 \times 100 \div 22\cdot3196 = 113\cdot443 \text{ grains of pure gold.}—\text{Ans.}$$

By reference to Table II. we find that the weight of pure gold in the sovereign is 113·0016, and rightly conclude that the quotation means francs and centimes for one pound. This shows that the Paris rate for cheques on London is at ·39 per cent. premium on par, weight for weight.

By reference to Table III., fixed gold pars, against France will be found 25·22 francs for one pound. The quotation 25·32 shows ·39 per cent. premium on par.

(b) Italy, sight, 27 lire 49. What does this mean?

The terms lire and franc indicate the same weight of metal, namely, 4·480359 troy grains of pure gold. 100 centesimi make 1 lire. The sum is—

$$27\cdot49 \times 100 \div 22\cdot3196 = 123\cdot165 \text{ grains of pure gold.}—\text{Ans.}$$

27 lire 49 centesimi being the rate upon London, this is the rate for one pound. This shows that the Italian rate is 8·9 per cent. above fixed par. This indicates that the intermediary consists of inconvertible paper based on gold to the extent of 7 per cent. premium in paper upon gold, since the cost of the transmission of metal would not perhaps exceed 1 per cent.

Lire and franc being terms for the same weight of gold, we turn to Table III., and against France find f. 25·22; this deducted from 27·49 shows 8·9 per cent. upon the lower figures.

(c) Shanghai T.T. 2s. 7½d. What does this mean?

It means that someone in Shanghai has bought or is prepared to buy or sell a telegraph transfer on London at the rate of 2s. 7½d. to be paid there for 1 tael paid in Shanghai. It is in its order an exchange of silver for gold, and not the other way

round, an exchange of gold for silver. The scientific, common-sense, and straightforward quotation, therefore, is taels per pound. The sum is—

$$240d. \div 31.875d. = 7.53 \text{ taels per pound.}$$

Let us look this way at it, and afterwards in the present mode of quoting and working. The tael is 516.4058 grains of silver; the pound 113.0016 grains of gold. The ratio between the metals in London, 33.31 of silver to 1 of gold. What ratio is yielded between the metals by the Shanghai price of the pound? The sum is—

$$\frac{516.4058 \times 7.53}{113.0016} = 34.41 \text{ ratio of silver to 1 of gold. —Ans.}$$

The London ratio is 33.31 to 1. The difference between 33.31 and 34.41 is 3.3 per cent. on the smaller amount. This is a premium of 3.3 per cent. paid in Shanghai for the London equivalent at the ratio of 33.31 to 1.

Now we will look at the transaction as it is quoted, viz. a fixed rate in Shanghai for a variable rate in London. The weight of gold indicated by $31\frac{1}{2}d.$ is 16.008 grains of gold. The sum is—

$$31.75d. \div 2.1238d., \text{ i.e. sign for 1 grain} = 16.008 \text{ grains of gold.}$$

$$516.4058 \text{ grains of silver} \div 16.008 \text{ grains of gold} = 32.26 \text{ of silver to 1 of gold. —Ans.}$$

The difference between 32.26 and 33.31 is 3.25 per cent. on the smaller amount.

By reference to Table V., gold for silver, against China $32.92d.$ is found as the equivalent British price for 1 tael at 33.31 parts of silver to 1 part of gold. This shows that London gives 3.15 per cent. less than absolute par for the tael.

(d) Calcutta $15\frac{15}{16}d.$ T.T. What does this mean?

As this means either a genuine silver rupee price in Calcutta for a portion of a pound sterling, or a fictitious rupee price for the same sum, first try whether it is a genuine rupee price by finding how many grains of gold the quotation indicates. 165 grains of silver in a rupee.

$$15.9375d. \div 2.123863d. = 7.50 \text{ grains of gold.}$$

Take the ratio between the metals at 33·31 of silver to 1 of gold. Then—

$$\frac{7\cdot5 \times 33\cdot31}{165} = \text{rupee } 1\cdot51. \text{—Ans.}$$

We find it is a fictitious rupee, carrying a fictitious value of 50 per cent.

By reference to Table V., against British India the equivalent pence for 1 rupee at 33·31 to 1 is 10·52*d.* 15·9375*d.* shows that upon 10·52*d.* the premium is 48·2 per cent. The use of the monetary sign for 1 grain of pure metal is shown here as a multiplier. What is the British equivalent to 1 rupee at 33·31 to 1? The sum is—

$$165 \div 33\cdot31 \times 2\cdot123863d = 10\cdot57d. \text{—Ans.}$$

(e) Rio de Janeiro 8· $\frac{9}{16}$ *d.* What does this mean?

$$8\cdot0625 \div 2\cdot123863d. = 3\cdot8 \text{ grains of gold.—Ans.}$$

In Table II., against Brazil the weight of pure gold in the milrei will be found; it is 13·8348 troy grains. This indicates that the quotation is for an inconvertible paper milrei, and that the premium in paper upon the gold milrei is 261 per cent.

(f) Buenos Ayres 18·97*d.* What does this mean?

$$18\cdot97 \div 2\cdot123863d. = 8\cdot93 \text{ grains of gold.—Ans.}$$

In Table II., against Argentina the weight of gold in the peso is 22·4017 grains of gold. This shows that the inconvertible paper is meant, and that gold in paper is at 150 per cent. premium.

RATIO BETWEEN THE METALS.

Another most important factor is the variable ratio between the metals gold and silver. A large number of the succeeding sums illustrate the value of this tool.

I. THE WORLD'S INTERCHANGES OF THINGS EFFECTED BY MEANS OF A SCIENTIFIC AUTOMATIC GOLD MEDIUM.

Assume that the whole world used the same weights and measures, say the metric. That it is the universal practice that nothing is done by the State to fetter or favour the substance

gold. That there is no coinage charge. That each country has an ample amount of gold in currency and reserve for the conduct of its business. Assume further that the nomenclature of money is confined to weight. The intermediary under these conditions would be a scientific automatic gold one, and credit instruments would be converted into gold for the weight expressed upon them without question, delay, or expense, at the will of the holder of them. There would be no prices of intermediaries. Prices would be weights of gold. The exchange of the gold intermediary would be a small percentage more or a small percentage less than a given weight. This percentage variation would be confined to a narrow limit. It would embrace the cost of transmission of gold and a small profit to those who employ a dealer in the exchange. The variation could not well be more than $1\frac{1}{2}$ per cent. between the most distant ports of the earth. Perhaps it may be asserted that the people of the earth affected by and engaged in intercolonial and international trade number not far short of 1,400,000,000, inhabiting 180 or more distinctive portions of continents and islands. These use, desire, or intend to use one of the two metals, gold and silver, as their standard substance, measure of value, and equivalent in exchange. In fact, they have long ago appointed definite weights of these substances under various names, such as the pound, the franc, the dollar, for this purpose.

METHOD WITH ALL CURRENCY EXCHANGES.

This is the manner in which the exchange of currency intermediaries is dealt with under my system.

I. The fluctuating amount of currency in the country originating the operation for the whole chief money of account of the country operated upon. Thus—

The British Isles upon France—9·47 to 9·55 pence for a franc
 France upon the British Isles—25·10 to 25·22 francs for a pound
 British India upon the British Isles—11 to 22 rupees for a pound
 British Isles upon British India—21·8 to 10 pence for a rupee

II. To find the fixed or absolute pars of exchange.

Fixed Metal Pars of Exchange.—These are different monetary signs for the same weight of one metal, either gold or silver.

Take gold. The sovereign at mint issue weight is 113·0016 troy grains of pure gold; the franc at mint issue weight is 4·4803 troy grains of pure gold.

I. To ascertain the French monetary sign for the British pound, the sum is—

$$113\cdot0016 \div 4\cdot4803 = \text{francs } 25\cdot22\cdot15 \text{ centimes.}—\text{Ans.}$$

II. The British monetary sign for a franc? The sum is—

$$4\cdot4803 \div 113\cdot0016 = \cdot03964 \text{ of } £ \times 240 \text{ D} = 9\cdot515 \text{ pence.}—\text{Ans.}$$

There is another method of reaching the same answer.

III. The British monetary sign for one troy grain of pure gold is 2·123863 pence. The weight of pure gold in the franc multiplied by this will give the British monetary sign for one franc. The sum is—

$$4\cdot4803 \times 2\cdot123863 = 9\cdot52 \text{ pence.}—\text{Ans.}$$

Another method of obtaining a closely approximate answer.

IV. The weight of pure gold indicated by one penny is ·4708 of a grain: the franc is 4·4804 grains of pure gold. The sum is—

$$4\cdot4804 \div \cdot4708 = 9\cdot516 \text{ pence.}—\text{Ans.}$$

V. Take silver. The Shanghai tael weight has as its equivalent 516·4058 troy grains of pure silver. The mint issue weight of the Mexican dollar or peso is 377·1809 troy grains of pure silver. What is the Mexican monetary sign for one tael? The sum is—

$$516\cdot4058 \div 377\cdot1809 = 7\cdot36 \text{c. dollar or peso.}—\text{Ans.}$$

VI. The China monetary sign for a dollar? The sum is—

$$377\cdot1809 \div 516\cdot4058 = 730 \text{ cash.}—\text{Ans.}$$

These fixed pars between the 17 gold systems and between 12 chief silver coins will be found on pages 47-54. These fixed pars in a chain rule sum are worked on mint issue weights of pure metal, gold or silver. The fixed par of exchange between the British Isles and France is 9·515 pence, and the link in the chain would thus appear—

$$\text{grains of gold } 113\cdot0016 = 4\cdot4804 \text{ grains of gold}$$

The link in the chain if equivalent monetary signs were worked with would be—

$$\text{franc } 1 = 9.515 \text{ pence}$$

The same principles apply to fixed silver pars of exchange.

Absolute Metal Pars of Exchange.—These are based upon the almost daily varying gold price of silver in gold standard countries, and similar variations in the silver price of gold in silver standard countries. The daily ratio between gold and silver is one of the most important items of information that could be given to the commercial and financial world. It can be ascertained from the commercial news furnished now by most daily papers through taking the market quotation for an ounce of silver and dividing the constant 943 by it.

VI. The London price of silver to-day, the 21st of September, 1898, is $28\frac{5}{16}$ pence per ounce, and it is desired to know what ratio of silver to 1 of gold is indicated by the quotation. The sum is—

$$943 \div 28.3125 = 33.31 \text{ parts of silver to 1 part of gold.} \text{—Ans.}$$

A constant for use in determining the ratio resulting from a given price is attached to each monetary system in Table I. presented herewith.

Absolute Currency Pars of the Day depend upon (I.) the variable ratio between gold and silver. (II.) The variable increased purchasing power conferred by legislation on a definite weight of silver, such as exists in the British Indian currency exchange intermediary at the present time, the 165 grains of silver in the rupee doing the work of 248 grains of silver. (III.) The variable paper premium on gold. (IV.) The variable paper premium on silver.

To obtain the absolute par between a gold and a silver intermediary, three equations are introduced into a chain rule sum. To find the absolute par of exchange between the British Isles and Mexico, the mint issue weight of the pound and the mint issue weight of the peso, together with the ratio of the day between gold and silver, determine it.

State the mode of reaching the absolute par of exchange

between the British Isles and Mexico, the ratio being 33·31 parts of silver to 1 part of gold, the links are—

$$\begin{array}{rcl} \text{peso 1} & = & 377\cdot181 \text{ grains of silver} \\ \text{grains of silver 33}\cdot\text{31} & = & 1 \text{ grain of gold} \\ \text{grains of gold 5}\cdot\text{65} & = & 1 \text{ shilling} \end{array}$$

VII. What is the absolute par of exchange of the day, weight for weight, in the British Isles with Mexico, the ratio of silver to 1 of gold being 33·31? The Mexican peso or dollar at mint-issue weight is 377·1809 troy grains of pure silver; the British shilling is a token for the 20th part of a pound, and therefore does the work of 5·65 troy grains of gold. The sum is—

$$\begin{array}{rcl} ? \text{ (shillings)} & = & 1 \text{ dollar} \\ \text{dollar 1} & = & 377\cdot1809 \text{ troy grains of silver} \\ \text{ratio of silver to 1 of gold 33}\cdot\text{31} & = & 1 \text{ of gold} \\ \text{grains of gold 5}\cdot\text{65} & = & 1 \text{ shilling} \end{array}$$

$$\frac{1 \times 377\cdot1809 \times 1 \times 1}{1 \times 33\cdot31 \times 5\cdot65} = 2\cdot004 \text{ shillings.} \text{—Ans.}$$

24 and $\frac{3}{4}$ th pence is the absolute par between the British Isles and Mexico for the peso at 33·31 parts of silver to 1 part of gold. The Mexican coinage charge is 2 per cent. The equivalent exchange to the cost of the silver with shipping and all charges including the 2 per cent. coinage charge and loss of interest for the time between the purchase of silver in the British Isles and the possession of the peso in Mexico, say $3\frac{1}{2}$ per cent., would bring it up to 24·004 pence + $3\frac{1}{2}$ per cent. = 24·84 pence, or $24\frac{2}{3}\frac{9}{2}$ pence. In 1873 the ratio of silver to gold was not half of what it is now, and in consequence the British price of the peso was 54 pence.

VIII. What is the absolute par of exchange of the day, weight for weight, between a Shanghae tael and a dollar of the United States of North America, at a ratio of 33·31 of silver to 1 of gold, the tael 516·4058 troy grains of pure silver, and the dollar 23·22 troy grains of pure gold?

$$\begin{array}{rcl} ? \text{ (tael)} & = & 1 \text{ U.S.A. gold dollar} \\ \text{dollar 1} & = & 23\cdot22 \text{ troy grains of pure gold} \\ \text{grain 1} & = & 33\cdot31 \text{ of silver} \\ \text{troy grains of silver 516}\cdot\text{4058} & = & 1 \text{ tael} \end{array}$$

$$\frac{1 \times 516\cdot4058 \times 33\cdot31 \times 1}{1 \times 1 \times 23\cdot22 \times 33\cdot31} = \text{tael } 1\cdot394, \text{—Ans.}$$

In the following examples of the working of the exchanges of intermediaries, weights of metal will be used in preference to monetary signs.

THE WHOLE WORLD'S FUTURE SINGLE INTER-MEDIARY: SCIENTIFIC AUTOMATIC GOLD.

THE FOREIGN AND COLONIAL EXCHANGES OF SCIENTIFIC AUTOMATIC GOLD FOR SCIENTIFIC AUTOMATIC GOLD.

Assume that the whole world's chief money of account consists of 6 grams of pure gold or 92·594 troy grains, with appropriate alloy to make one chief standard coin to bear the effigies of each mint issuing it; that monetary signs are gone for ever, and that the sole nomenclature of money is weight, and we have reached a haven of rest in the simplicity of prices and the world's foreign and colonial exchanges. One instead of seven measures of prices. Two proportions in the place of forty-nine different proportions at present composing the forty-eight different exchanges of the seven intermediaries. Examples will be given for the guidance of those who travel, who are engaged in commerce or deal in finance and stocks. Use will be made of the chain rule.

I. TRAVEL.

To convert forty gold coins bearing the Brazilian stamp into British gold in London. One-half per cent. would cover the cost of transmission of gold between the British Isles and Brazil. An eighth of 1 per cent. would be a fair profit. The sum is—

$$40 \times 6 - \frac{5}{8}\% = 238\cdot5 \text{ grams.} \text{—Ans.}$$

238·5 grams in British money for 240 grams of Brazilian money.

II. COMMERCE.

Silk in China at 4·875 decigrams of gold for 23·25 grams of silk, shipping insurance and all other charges exclusive of

freight to London, 10 per cent. on cost, the rate of exchange at 1 per cent. discount. What is the cost? The sum is—

$$\begin{aligned} \text{? decigrams of gold} &= 23.25 \text{ grams of silk} \\ \text{grams of silk } 23.25 &= 4.875 \text{ decigrams of gold} \\ 100 &= 110 \text{ with charges} \\ \text{discount on exchange } 100 &= 99 \end{aligned}$$

$$\frac{4.875 \times 110 \times 99}{100 \times 100} = 5.309 \text{ decigrams.}—\text{Ans.}$$

If the purchaser of the bill becomes at the same time the possessor of the silk, 5.107 is the cost of the silk to London without freight and charges, but if the seller of the bill still retains possession of the silk, he has not recovered what he has spent on the silk, and the deficiency he must obtain in a proportionate higher price at the time of sale.

Perhaps it may be roughly stated that at the present time, taking Austria, Hungary, and Japan as forming part, four-fifths of the world's trade in value is carried on by means of either an automatic gold or a gold-cum-counter-charge intermediary. Between these countries the extreme limits to the fluctuation of the exchanges may be taken at about 3 per cent.

III. FINANCE AND STOCKS.

I. A financier or Stock Exchange operator in London desires to know what would be the cost of property purchased in that city for 28,984.35 kilos of pure gold, and sent to China. Transmission, insurance, stamps, brokerage, time occupied in the transaction, and other charges being $2\frac{1}{2}$ per cent. The sum is—

$$28,984.35 + 2\frac{1}{2} = 29,708.96$$

II. Between the same places property bought at 84 per cent. What must it sell at to return the cost?

$$84 + 2\frac{1}{2} \text{ per cent.} = 86.15 \text{ per cent.}$$

Between two countries each of which is in possession of an effective gold standard the exchanges are conducted in precisely the same manner as in the above examples; the only difference being that the metric weights are used, and no monetary signs are introduced, the weight of pure gold, the thing signified, taking the place of the signs. Where coinage charges exist,

they are definite percentage charges affecting the exchange of the intermediary upon which the charge is imposed.

A miligram is about the 448th part of a franc, and the French monetary sign for it is about $\cdot 22$ of a centime; $\frac{1}{16}$ of a miligram is about the 7168th part of a franc; the monetary sign for the 6400th part of a franc is $\frac{1}{64}$ of a centime.

A miligram is about the 7322nd part of a British pound; the British monetary sign for the 7680th part of a pound is $\frac{1}{32}$ of a penny.

When this system is adopted and maintained by the whole world, a price would be a definite weight of pure gold, and a rate of exchange would also be a definite weight of pure gold, and all ambiguity about the foreign and colonial exchanges would be gone for ever. Also the interchanges of things would be conducted on the conditions of barter.

THE WORLD'S PRESENT INTERCHANGES OF THINGS EFFECTED BY MEANS OF SEVEN INTERMEDIARIES.

Though the world may in the course of time use but one intermediary, there would be in the international and inter-colonial interchanges of things four prices and two rates of exchange of the one intermediary. Take A to denote the port of one country and B the port of another country. There would be two prices in A, one of the thing sent to B, and another of the thing received from B, and a rate of exchange consisting of a small percentage weight more or less than cost of the thing sent to B. Two prices in B, one of the thing sent to A and another of the thing received from it, and a rate of exchange on the cost of the thing sent to A. We have seen how that under one intermediary for the whole world the limit to the fluctuation of the exchange of the intermediary would be confined within the narrowest limits. Of the seven intermediaries with which we are about to deal, two—namely, the gold-cum-coinage charge one and the silver-cum-coinage charge one—are burdened with a fixed percentage charge. This charge varies from a small sum per mille to 2 per cent. To the extent of the charge it is an impediment in the interchanges of things, enhancing the inter-

national price of a thing received in the country imposing the charge.

THE WORLD'S PRESENT SEVEN MONETARY AND CURRENCY INTERMEDIARIES.

- I. Scientific automatic gold as the British pound.
- II. Scientific automatic silver as the Shanghai tael.
- III. Gold-cum-coinage charge as the Australian pound.
- IV. Silver-cum-coinage charge as the Mexican peso.
- V. Silver-cum-counter charge as the Indian exchange rupee.
- VI. Inconvertible paper based on gold as the Argentine peso.
- VII. Inconvertible paper based on silver as the Columbian sol.

These seven different descriptions of intermediaries which are used in the interchanges of things within countries, and in the conduct of their foreign and colonial commerce, produce forty-nine different descriptions of exchanges of intermediaries, which are as follows :—

I. **Automatic Gold** for automatic gold, or for II. **Automatic silver**, or for III. **Gold-cum-coinage charge**, or for IV. **Silver-cum-coinage charge**, or for V. **Silver-cum-counter charge**, or for VI. **Inconvertible paper based on gold**, or for VII. **Inconvertible paper based on silver**.

VIII. **Automatic Silver** for automatic silver, or for IX. **Automatic gold**, or for X. **Gold-cum-coinage charge**, or for XI. **Silver-cum-coinage charge**, or for XII. **Silver-cum-counter charge**, or for XIII. **Inconvertible paper based on gold**, or for XIV. **Inconvertible paper based on silver**.

XV. **Gold-cum-coinage charge** for gold-cum-coinage charge, or for XVI. **Automatic gold**, or for XVII. **Automatic silver**, or for XVIII. **Silver-cum-coinage charge**, or for XIX. **Silver-cum-counter charge**, or for XX. **Inconvertible paper based on gold**, or for XXI. **Inconvertible paper based upon silver**.

XXII. **Silver-cum-coinage charge** for Silver-cum-coinage charge, or for XXIII. **Automatic gold**, or for XXIV. **Automatic silver**, or for XXV. **Gold-cum-coinage charge**, or for XXVI. **Silver-cum-counter charge**, or for XXVII. **Inconvertible paper based on gold**, or for XXVIII. **Inconvertible paper based on silver**.

XXIX. Silver-cum-counter charge for silver-cum-counter charge, or for XXX. Automatic gold, or for XXXI. Automatic silver, or for XXXII. Gold-cum-coinage charge, or for XXXIII. Silver-cum-coinage charge, or for XXXIV. Inconvertible paper based on gold, or for XXXV. Inconvertible paper based on silver.

XXXVI. Inconvertible paper based on Gold for inconvertible paper based on gold, or for XXXVII. Automatic gold, or for XXXVIII. Automatic silver, or for XXXIX. Gold-cum-coinage charge, or for XL. Silver-cum-coinage charge, or for XLI. Silver-cum-counter charge, or for XLII. Inconvertible paper based on silver.

XLIII. Inconvertible paper based on Silver for inconvertible paper based on silver, or for XLIV. Automatic gold, or for XLV. Automatic silver, or for XLVI. Gold-cum-coinage charge, or for XLVII. Silver-cum-coinage charge, or for XLVIII. Silver-cum-counter charge, or for XLIX. Inconvertible paper based on gold.

A necessary condition of a scientific automatic metal monetary standard, constituting an absolute measure of value and an equivalent in exchange, is that the substance so used should do its work without fetter or favour on the part of the Government. A coinage charge is a fetter. Legislation whereby a given weight of metal does the work of a larger weight is an impediment to trade imposed by Government. As, for instance, at the present time the British Indian rupee of 165 troy grains weight of pure silver does the work as an intermediary of 250 troy grains of silver, or 55 per cent. more than the intermediary used in effecting local exchanges, if not throughout the whole country, certainly on the seaboard of India, Ceylon, and Mauritius.

Another essential condition of an effective metal monetary system is that State and bank credit instruments in the shape of notes payable on demand are convertible into the weight of standard substance indicated upon the note at the will of the holder of the note without question, delay, or expense.

The term silver-cum-counterecharge denotes that a Government by legislation has conferred a fictitious value upon silver. A counter is not meant for use at its intrinsic worth. Metal, to

do its work as money, is intended to pass as an intermediary in some near relation to the value factors contained in it in comparison with the value factors contained in the things for which it is exchanged. This is the meaning of the statement, "That money, i.e. standard money, is an equivalent in exchange."

A coinage charge adds to the cost of the goods imported into a country imposing the charge. A coinage charge does not benefit the export trade of a country imposing such a charge, since the metal forming its standard substance has no more worth in other intermediaries than the world's market price of silver as an article of commerce. The fact that a metal is an article of commerce largely required for other than currency purposes mainly constitutes its fitness for use as a measure of value and an equivalent in exchange.

Coinage charge on the standard substance being of a certain nature in each country, it becomes unnecessary to present in detail instances for the instruction of travellers, international and intercolonial traders, and financiers. In a chain rule statement of an operation between a country and another imposing such a charge, a link in the chain affecting the exchange of the intermediaries would be added; say the charge is $1\frac{1}{2}$ per cent.

$$100 = 101\cdot5$$

A traveller could never lose by this charge; he should sometimes gain, but the gain would never be much.

FACTORS IN THE WORLD'S PRESENT PRICES AND EXCHANGES OF INTERMEDIARIES.

We have seen that the day may come when the whole world shall have three factors in its money for all purposes. A weight of pure metal; a premium or more than a given weight; a discount or less than a given weight.

The world's seven present intermediaries constituting prices and the foreign and colonial exchanges embrace twelve factors, as follows:—

I. Weight of gold.

II. Monetary signs for weights of gold.

- III. Weight of silver.
- IV. Monetary signs for weights of silver.
- V. Charge for coinage.
- VI. Charge for constituting fictitious money by legislation.
- VII. Charge in the shape of premium in paper for silver.
- VIII. Charge in the shape of premium in paper for gold.
- IX. Charge on the movement of metal.
- X. Charge for the exchange of one currency for another.
- XI. Fixed pars of exchange between intermediaries.
- XII. Absolute pars of exchange of the day between intermediaries.

THE FACTORS WHICH ARE USED IN EACH CURRENCY SYSTEM.

I. Automatic Gold.—Weights and monetary signs for gold. A price in this system is a weight of pure gold. As an international intermediary; a charge on the movement of metal and a charge for the exchange of this currency for another play their part.

II. Automatic Silver.—The remarks upon automatic gold apply to automatic silver.

III. Silver-cum-coinage Charge.—Weights and monetary signs for silver, a fixed percentage coinage charge, a charge on the movement of metal, and a charge for the exchange of this currency for another. Price in this system is a silver-cum-coinage charge price.

IV. Gold-cum-coinage Charge.—The remarks under silver-cum-coinage charge apply to gold-cum-coinage charge.

V. Silver-cum-counter Charge.—Weights and monetary signs for silver with a variable percentage premium on silver to do the work of a heavier weight of silver; a charge on the movement of metal, and a charge for the exchange of this currency for another. The rate for the foreign and colonial exchanges of this system is a silver-cum-counter charge rate.

VI. Inconvertible Paper based on Gold.—Weights and monetary signs for weights of gold, a fluctuating percentage paper premium on gold which acts as an equivalent discount on the weight of gold in the chief money of account in use in

the system, a charge on the movement of metal, and a charge for the exchange of this currency for another. Price and a rate of exchange of the intermediary are both inconvertible paper based on gold price and rate of exchange.

VII. Inconvertible Paper based on Silver.—The remarks under inconvertible paper based on gold apply to inconvertible paper based on silver.

FIXED AND ABSOLUTE PARS OF EXCHANGE. RATIOS.

In working the forty-nine exchanges of the seven intermediaries the first step is to determine the fixed or absolute ratio between them. Fixed pars exist between countries the standard in which is of the same metal. Gold pars are different countries' different monetary signs for the same weight of gold. Silver pars are different countries' monetary signs for the same weight of silver. Absolute pars are subject to daily fluctuations, and depend upon the ratio of the day between the metals gold and silver, the fluctuating percentage bounty produced by a counter charge, or the discount on the weight of gold or silver resulting from the inconvertible paper premium on the metals. When the fixed or absolute pars are determined, then come into play in percentage form IX. and X., charge on the movement of metal and charge for the exchange of one currency for another.

N.B.—There is so much perplexity about the exchanges of intermediaries resulting from the unscientific teaching and practice in the world, that it should be thoroughly understood that the percentage deviation from fixed and absolute pars of exchange should always be taken on the currency of the country commencing the operation. Thus in the British Isles it would be a premium or a discount upon pounds, shillings, or pence for the currency of another country. This is the scientific method of working the exchanges. If I buy at a premium, I shall have less to receive than if I buy at par. If I buy at a discount, I shall have more to receive than if I buy at par.

Say a merchant or a financier buys something to send to another country, and sells his bill of exchange for the

purchase amount at a discount, it is evident that he has not received back the cost of the thing. By making his bill of such an amount that after deducting the discount the proceeds would equal the cost, is one way of meeting the difficulty. The other is by an enhanced price in the place where the thing is sold. If the bill is sold for more than the cost of the thing, the thing can be sold for less in the place it is sent to.

If a bill of exchange is sold at a premium on par, the seller obtains more than if it sold at par; whereas a buyer of the bill at a premium on par obtains less than if it sold at par.

The following would be the links in a chain rule sum:—

If a premium, say 50 per cent., is conferred on metal by legislation, the link in working for an answer in rupees would be—

$$100 = 150$$

The premium in paper upon gold or silver is also worked in the same manner; say the paper premium is 140 per cent., the statement is—

$$\text{paper } 240 = 100 \text{ metal}$$

When a shipper of goods sells his bill against the goods at a premium upon fixed or absolute par, he obtains more than the cost of his goods, and therefore can afford to sell them for less at the port of discharge: this premium must therefore be taken at an equivalent discount as a link in the chain; say he has sold at $2\frac{1}{2}$ per cent. premium, the discount is 2.44 and the link would appear as—

$$100 = 97.56$$

When a shipper of goods sells his bill against the goods at a discount upon fixed or absolute par, he obtains less than the cost of his goods, and therefore must obtain that amount more at the port of discharge, the discount therefore must be taken at an equivalent premium as a link in the chain; say he has sold at $2\frac{1}{2}$ per cent. discount, the equivalent premium is 2.56 and the link result appear as—

$$100 = 102.56$$

A per centage charge which adds to the cost of any thing would take its place in the chain as the less equal to the

greater; say the charge is $2\frac{1}{2}$ per cent., the equation would be $100 = 102\cdot5$. Anything in the nature of a per centage which would diminish the cost of a thing would take its place in the chain as the greater equal to the less; say the discount is $2\frac{1}{2}$ per cent., the equation would be $100 = 97\cdot5$.

We now proceed with sums illustrative of the exchanges of intermediaries.

I.

AUTOMATIC GOLD FOR AUTOMATIC GOLD.

I. TRAVEL.

State and other accounts in Canada are kept in dollars. The dollars of the U.S.A. and the British pound are legal tender. The mint issue weight of a dollar is $23\cdot22$ troy grains, that of a British pound $113\cdot0016$ troy grains. What amount in British money in London would \$580 exchange at $\frac{1}{2}$ per cent. discount command?

XII. The sum is—

$$\begin{array}{rcl}
 ? (\text{£}) & = & 580 \text{ dollars} \\
 \$1 & = & 23\cdot22 \text{ grains of gold} \\
 \text{grains of gold } 113\cdot0016 & = & \text{£}1 \\
 100 & = & 99\cdot5 \text{ discount} \\
 29 & 11\cdot61 & 19\cdot9 \\
 \frac{29 \times 11\cdot61 \times 1 \times 99\cdot5}{1 \times 113\cdot0016 \times 100} & = & \text{£}118 \text{ } 11\text{s. } 10\text{d.} - \text{Ans.} \\
 & & 56\cdot5008
 \end{array}$$

FIXED PAIRS OF EXCHANGE.

$$\$4\cdot866 = \text{£}1$$

$$\text{Pence } 49\cdot316 = \$1$$

Throughout these examples “grains of gold” mean troy grains of pure gold, and “grains of silver” mean troy grains of pure silver.

II. COMMERCE.

XIII. What would be the cost of a lb. of silk in London purchased in Canada at \$4 per lb., packing, shipping, insurance, and all other charges except freight to London, 12 per cent.; and the discount in dollars for the pound, $\frac{1}{2}$ per cent.?

If a bill of exchange is sold at a discount on par, the seller obtains less than if it sold at par; whereas a buyer of a bill at a discount on par obtains more than if it sold at par. As between two countries the one in which the rate of exchange is much above par is said to be against the country in which the high rate exists.

XIII. The sum is—

$$\begin{aligned} ? \text{ (shillings)} &= 1 \text{ lb. silk} \\ 1 &= 4 \text{ dollars} \\ \text{dollar } 1 &= 23.22 \text{ grains of gold} \\ \text{grains of gold } 5.65 &= 1 \text{ shilling} \\ 100 &= 112 \text{ with charges} \\ \text{exchange } 100 &= 99.5 \end{aligned}$$

$$\frac{1 \times 4 \times \overset{11.61}{\cancel{28.22}} \times 1 \times \overset{56}{\cancel{1112}} \times \overset{19.9}{\cancel{99.5}}}{1 \times 1 \times \underset{1.13}{\cancel{5.65}} \times \underset{25}{\cancel{100}} \times \underset{25}{\cancel{100}}} = 18s. 4d. \text{ per lb.} - \text{Ans.}$$

III. FINANCE AND STOCK.

What is the cost of property in London bought in Canada at \$18,976, stamps, insurance, commission, and all charges to London, $2\frac{1}{2}$ per cent.?

XIV. The sum is—

$$\begin{aligned} ? \text{ (pounds)} &= 18,976 \text{ dollars} \\ \text{dollar } 1 &= 23.22 \text{ grains of gold} \\ \text{grains of gold } 113.0016 &= £1 \\ 100 &= 102.5 \text{ with charges} \end{aligned}$$

$$\frac{18,976 \times \overset{11.61}{\cancel{28.22}} \times 1 \times \overset{20.5}{\cancel{102.5}}}{1 \times \underset{3.5313}{\cancel{113.0016}} \times \underset{10}{\cancel{100}}} = £3996 \text{ 6s.} - \text{Ans.}$$

Stock is quoted in London at $91\frac{1}{4}$ per £100. What is the cost in the U.S.A. per £100, charges $2\frac{1}{2}$ per cent.?

XV. The sum is—

$$\begin{aligned} ? \text{ (dollars)} &= £91.25 \\ £1 &= 113.0016 \text{ grains of gold} \\ \text{grains of gold } 23.22 &= 1 \text{ dollar} \\ 100 &= 102.5 \text{ with charges} \end{aligned}$$

$$\frac{91.25 \times \overset{28.2504}{\cancel{113.0016}} \times 1 \times \overset{4.1}{\cancel{102.5}}}{1 \times \underset{\underset{1}{\cancel{23}}}{23.22} \times \underset{\cancel{100}}{\cancel{100}}} = \$455.17. - \text{Ans.}$$

II.

AUTOMATIC GOLD FOR AUTOMATIC SILVER.

The average of the gold prices of silver in London for 1872 is $60\frac{5}{16}$ per standard ounce, giving the ratio of 15·64 parts of silver to 1 part of gold. The present ratio of silver to 1 of gold is 33·31, an increase of 113 per cent. In the past quarter of a century the silver price of gold has risen 113 per cent., and the gold price of silver has fallen 53·33 per cent. In August, 1897, the ratio was 39·5 parts of silver to 1 part of gold. The present ratio is taken in the following examples, and for the sake of comparison the ratio of 1872 will be taken.

I. TRAVEL.

A tael of silver is not a currency met with by travellers. But China uses the Mexican dollar as an intermediary in her foreign trade. The Chinese Government has not done anything to fetter or favour the Mexican dollar. It effects its work as a weight of pure silver. The percentage additional cost in silver for its manufacture into pesos including coinage charge in Mexico does not add to its value in international interchanges.

It is desired to exchange 285 Mexican dollars or a promise to pay them on demand of equal value with the dollars into British money. The Mexican peso or dollar is 377·181 grains of silver, and the pound is 113·0016 grains of gold; the ratio between the metals being 33·31, and the exchange dealers charge $1\frac{1}{2}$ per cent.

XVI. The sum is—

$$\begin{aligned} \text{? (pounds)} &= 285 \text{ dollars} \\ \text{dollar 1} &= 377\cdot181 \text{ grains of silver} \\ \text{silver 33}\cdot31 &= 1 \text{ gold} \\ \text{grains of gold 113}\cdot0016 &= \text{£}1 \\ 100 &= 98\cdot5 \end{aligned}$$

$$\frac{57}{\cancel{285} \times 377\cdot181 \times 1 \times 1 \times \cancel{98\cdot5}} \times \frac{19\cdot7}{\cancel{1} \times 33\cdot31 \times 113\cdot0016 \times \cancel{4}} = \text{£}28 \text{ 2s. 8d.} \text{—Ans.}$$

There is another way of doing this sum. Find the par established between the dollar and the British shilling at the

given ratio. On the result deduct $1\frac{1}{2}$ per cent., and with that multiply the 285 dollars. The twentieth part of a pound is 5.65 troy grains of pure gold.

XVII. To find the par the sum is—

$$\frac{377.181 \text{ silver}}{\text{ratio } 33.31 \times 5.65 \text{ gold}} = 2.004 \text{ shillings.} - \text{Ans.}$$

then $285 \times 2.004 - 1\frac{1}{2}$ per cent. = £28 2s. 7d. —Ans.

At the ratio of 15.64 parts of silver to 1 of gold the traveller would in 1872 have obtained £59 18s. for the 285 Mexican dollars. This can be discovered by substituting 15.64 for 33.31 in the above examples. A measurable difference which made a deep impression upon the mind of the traveller, who, if he did not trace the mechanism of the change, felt it in his pocket.

ABSOLUTE PARS OF EXCHANGE.

Ratio 15.64 to 1	Ratio 33.31 to 1
\$4.68 = £1	\$9.98 = £1
Pence 51.22 = peso 1	Pence 24.04 = peso 1

II. COMMERCE.

The price of silk in China is 816 taels per picul, all charges to London except freight 12 per cent., the rate of exchange 2 per cent. discount. 1 picul equals 140 lbs. av., the ratio between the metals 33.31 to 1; a shilling is the British sign for 5.65 grains of gold, the tael 516.4058 grains of silver.

XVIII. The sum is—

$$\begin{aligned} ? \text{ (shillings)} &= 1 \text{ lb. av. of silk} \\ &140 = 1 \text{ picul} \\ &\text{picul } 1 = 816 \text{ taels} \\ &\text{tael } 1 = 516.4058 \text{ grains of silver} \\ &\text{silver } 33.31 = 1 \text{ of gold} \\ &\text{grains of gold } 5.65 = 1 \text{ shilling} \\ &100 = 112 \text{ with charges} \\ &\text{exchange } 100 = .98 \text{ discount} \end{aligned}$$

$$\frac{1 \times 1 \times \frac{51}{5} \times 516.4058 \times 1 \times 1 \times \frac{4}{25} \times 98}{\frac{140}{5} \times 1 \times 1 \times 33.31 \times 5.65 \times \frac{140}{25} \times \frac{140}{25}} = 17s. 7d. \text{ per lb.}$$

attention to the subject from Xenophon, in the fifth century before Christ, to the present time. The British Indian mints being closed against the reception of silver from the public, 295 millions of people inhabiting British India, Burma, Ceylon, and Mauritius have no standard measure of value and equivalent in exchange. The rupee of 165 troy grains of pure silver was their standard coin, and is now the measure of their internal interchanges. But as a measure of their international and intercolonial interchanges they now possess a silver-cum-counter-charge intermediary. At present the universal gold value, or price, of the rupee at 33·31 parts of silver to 1 part of gold is 5·27 troy grains of pure gold, the British monetary sign for which is 11·39 pence. The rate for telegraph transfers upon India this day is $15\frac{3}{4}$ pence per rupee. This shows that legislation resulting in the closure of the mints in British India, and a duty on silver has added a fictitious value of 40·2 per cent. to the intermediary used in the international interchanges of these 295 millions of people. In other words, the 165 troy grains of silver do the work of 231·33 troy grains of silver. The possession by India, Burma, Ceylon, and Mauritius of a scientific automatic gold standard, which it is devoutly to be hoped may be brought about, would be the justification for the temporary use of such a rotten intermediary.

I. TRAVEL.

What could be obtained in London for 760 rupees in bank or equally good credit notes, and for 84 silver rupees, the intermediary rupee having a 40 per cent. counter-charge premium charges 1 per cent. discount?

XX. The sum is—

$$\begin{aligned}
 & ? \text{ (British pounds) } = 760 \text{ British rupees} \\
 & \quad \text{rupee } 1 = 165 \text{ troy grains of pure silver} \\
 & \quad \text{silver } 33.31 = 1 \text{ of gold} \\
 & \text{grains of gold } 113.0016 = 1 \text{ British pound} \\
 & \quad 100 = 140 \text{ with premium} \\
 & \quad 100 = 99 \text{ exchange}
 \end{aligned}$$

$$\begin{array}{r}
 190 \quad 33 \quad 7 \\
 75\phi \times 165 \times 1 \times 1 \times 14\phi \times 99 \\
 1 \times 33.31 \times 113.0016 \times 100 = \text{£}46 \text{ } 3\text{s. } 7\text{d.} \text{—Ans.} \\
 \quad \quad \quad 28.2504 \quad 1
 \end{array}$$

There is another method by which the same result can be reached, as given under absolute pars below. At 33·31 parts of silver to 1 part of gold, the £1 equals 22·81 rupees.

XXI. The sum is—

$$750 \div 22\cdot81 + 40 \text{ per cent.} - 1 \text{ per cent.} = £46 \text{ } 3s. \text{ } 5d. \text{—Ans.}$$

In 1872, at the then ratio, 10·71 rupees equalled £1, the absolute par, and then at the same discount the 760 rupees yielded £69 6s. 9d.

Rupees are still the circulation of India, Ceylon, and the Mauritius; upon their import into India there is a charge of 5 per cent. Take the charge for converting the 84 rupees into sterling at $1\frac{1}{2}$ per cent., charges for transmission to India, import duty, and time interest at 8 per cent., and the ratio of the day between the metals at 33·31 to 1.

XXII. The sum is—

$$\begin{aligned} ? \text{ (pounds)} &= 84 \text{ rupees} \\ \text{rupee } 1 &= 165 \text{ grains of silver} \\ \text{grains of silver } 33\cdot31 &= 1 \text{ grain of gold} \\ \text{grains of gold } 113\cdot0016 &= £1 \\ 100 &= 92 \text{ charges deducted} \\ 100 &= 98\cdot5 \text{ discount on exchange} \end{aligned}$$

$$\frac{21 \quad 33 \quad 23 \quad 19\cdot7}{\cancel{84} \times \cancel{165} \times 1 \times 1 \times \cancel{92} \times \cancel{98\cdot5}} = £3 \text{ } 6s. \text{ } 7d. \text{—Ans.}$$

$$\frac{1 \times 33\cdot31 \times \cancel{113\cdot0016} \times \cancel{100}}{\cancel{7\cdot0626} \times \cancel{4}} = £3 \text{ } 6s. \text{ } 7d. \text{—Ans.}$$

If, instead of being silver rupees, the 84 rupees had been in good Indian bank notes, their value at 15·75 pence for a rupee would have been £5 5s. 3d.

ABSOLUTE PARS.

Ratio 15·6 to 1.	Ratio 33·31 to 1.
Rupees 10·71 = £1	Rupees 22·82 = £1
Pence 22·41 = 1 rupee	Pence 10·51 = 1 rupee

Fictitious rupee 40 per cent. premium.

$$\begin{aligned} \text{Rupees } 16\cdot31 &= £1 \\ \text{Pence } 14\cdot71 &= 1 \text{ rupee} \end{aligned}$$

The price of Indian telegraph transfers to-day is 15·29/32 pence per rupee, or rupees, 15·08 to the pound. The weight

par being 10·51 pence per rupee, the fictitious exchange rupee shows a premium of 51·51 per cent.

II. COMMERCE.

What is the cost in London, without freight and London charges, of one pound of tea at 12 annas per seer; 112 lbs. equal to 60 factory seers, charges in India at 8 per cent., the exchange at $1\frac{1}{2}$ per cent. discount, and the exchange rupee at 50 per cent. premium upon the silver rupee; the ratio between gold and silver at 33·31. One penny is the sign for ·4708 of a grain of gold.

XXIII. The sum is—

$$\begin{aligned}
 ? \text{ (pence)} &= 1 \text{ lb. av. tea} \\
 \text{lbs. 112} &= 60 \text{ seers factory} \\
 \text{seer 1} &= 12 \text{ annas} \\
 \text{annas 16} &= 1 \text{ rupee} \\
 \text{rupee 1} &= 165 \text{ grains of silver} \\
 \text{grains of silver 33·31} &= 1 \text{ grain of gold} \\
 \text{grain of gold ·47} &= 1 \text{ penny} \\
 100 &= 150 \text{ premium on silver rupee} \\
 100 &= 108 \text{ with charges} \\
 100 &= 98·5 \text{ exchange discount}
 \end{aligned}$$

$$\begin{array}{r}
 \begin{array}{cccccccc}
 & 6 & 3 & & 33 & & 75 & 27 & 1\cdot97 \\
 & & & & & & & & \cancel{8\cdot9\cancel{8}} \\
 1 \times \cancel{6\cancel{6}} \times \cancel{1\cancel{2}} \times 1 \times \cancel{1\cancel{6}\cancel{6}} \times 1 \times 1 \times \cancel{1\cancel{8}\cancel{6}} \times \cancel{1\cancel{6}\cancel{6}} \times \cancel{9\cancel{8}\cdot\cancel{8}} \\
 112 \times 1 \times \cancel{1\cancel{6}} \times 1 \times 33\cdot31 \times \cancel{47\cancel{0}\cancel{8}} \times \cancel{1\cancel{6}\cancel{6}} \times \cancel{1\cancel{6}\cancel{6}} \times 100 \\
 \hline
 & \cancel{8} & & & & & \cancel{1\cancel{6}} & \cancel{2\cancel{7}} & \\
 & 1 & & & & & \cancel{1} & \cancel{4} & \\
 & & & & & & 1 & &
 \end{array}
 = 6\cdot74 \text{ pence—Ans.}
 \end{array}$$

III. FINANCE AND STOCKS.

At what amount per cent. of rupees in India must stock bought in London at £66 per £100 be sold for, the ratio between the metals being 33·31, the exchange rupee at 50 per cent. premium?

XXIV. The sum is—

Find the absolute par with a pound.

$$\begin{aligned}
 ? \text{ (exchange rupees)} &= £1 \\
 £1 &= 113\cdot0016 \text{ grains of gold} \\
 \text{gold 1} &= 33\cdot31 \text{ silver} \\
 \text{grains of silver 165} &= 1 \text{ rupee} \\
 \text{premium 150} &= 100
 \end{aligned}$$

$$\frac{1 \times 113\cdot0016 \times 33\cdot31 \times 1 \times \cancel{1\cancel{6}\cancel{6}}}{1 \times 1 \times 165 \times \cancel{1\cancel{6}\cancel{6}}} = 15\cdot208 \text{ rupees.—Ans.}$$

36 GOLD FOR INCONVERTIBLE PAPER ON GOLD

Convert £100 into rupees, and £66 into rupees, to which add $1\frac{1}{2}$ per cent. Divide the result of the latter by the result of the former to find the percentage rupees for 100 rupees.

$$\begin{aligned}\text{£}100 \times 15.208 &= 1520.80 \\ \text{£}66 \times 15.208 + 1\frac{1}{2} \text{ per cent.} &= 1018.784\end{aligned}$$

$$\frac{1018.784 \times 100}{1520.80} = 66.99 \text{ rupees per 100 rupees.---Ans.}$$

IV. AUTOMATIC GOLD FOR INCONVERTIBLE PAPER BASED ON GOLD.

Inconvertible paper, based upon one of the precious metals, is, perhaps, the most rotten intermediary which a country can use. On the sea-boards of the trading communities of the world a definite weight of gold, or a definite weight of silver, is the professed standard measure of value and equivalent in exchange to which each country has attached a sign for its chief money of account, as the pound, franc, and peso or dollar. A vast number of different communities use this wretched intermediary in Europe and the New World for both their internal and international interchanges of things. Nowhere throughout the East, among its 852 millions of peoples, is this abortive currency known.

I. TRAVEL.

What is the value in London of 617 pesos, consisting of the best notes of the Argentine Republic? The gold peso is 22.4012 grains of gold. Gold is at 157 per cent. premium there. Charges and risk amount to 4 per cent.

XXV. The sum is—

$$\begin{aligned} ? \text{ (pound)} &= 617 \text{ paper pesos} \\ \text{peso } 1 &= 22.4012 \text{ grains of gold} \\ \text{grains of gold } 113.0016 &= 1 \text{ pound} \\ \text{premium } 257 &= 100 \\ 100 &= 96 \end{aligned}$$

$$\frac{617 \times 5.6003 \times 1 \times 12}{1 \times 3.5313 \times 257 \times 1} = \text{£}45.68. \text{---Ans.}$$

Another method is to get at the absolute par between the intermediaries on the ratio of the day, the fluctuating factor being the paper premium on gold, and upon par in the money of the country in which the exchange is made to deduct the charge for the conversion of the foreign intermediary.

XXVI. The sums are—

? (shilling) = 1 paper peso
 gold peso 1 = 22.4012 grains of gold
 grains of gold 5.65 = 1 shilling
 premium 275 = 100

$$\frac{1 \times 22.4012 \times 1 \times \frac{20}{1.13}}{1 \times \frac{1.13}{1.13} \times 275} = 1.5427 \text{ shillings.} - \text{Ans.}$$

Then—

$$617 \times 1.5427 - 4 \text{ per cent.} = £45.688. - \text{Ans.}$$

Fixed Pars.

Pence 47.575 = 1 peso
 Pesos 5.044 = £1

Absolute par, gold at 157 premium.

Pence 18.512 = 1 peso
 Pesos 12.96 = £1

II. COMMERCE.

What is the cost in the Argentine Republic of one hectogram of tea, without charges in Argentina? 4.536 hectograms equivalent to 1 lb av., the price in London 10*d.* per lb., charges in London 3 per cent., paper premium on gold in Argentina 157 per cent.; exchange 4 per cent. against Argentina; a penny signifies .4708 grains of gold.

XXVII. The sum is—

? (centesimos) = 1 hectogram of tea
 hectograms 4.536 = 1 lb. av.
 lb. 1 = 10 pence
 penny 1 = .4708 grains of gold
 grain of gold .224 = 1 centesimo
 100 = 250 premium in paper
 100 = 103 London charges
 100 = 104 exchange

$$\frac{1 \times 1 \times 10 \times \frac{1.177}{1.177} \times 1 \times \frac{1}{1.177} \times 103 \times \frac{1.13}{1.13}}{\frac{1.13}{1.13} \times 1 \times 1 \times \frac{1}{2} \times \frac{1}{5} \times 100} = 12.41 \text{ centesimos.} - \text{Ans.}$$

The exchange of the intermediaries at the gold par of 5·044 pesos to the pound, instead of 12·96 pesos to the pound, would make the cost of the tea 4·96 centesimos, instead of 12·41 centesimos.

III. FINANCE AND STOCKS.

What amount of British money would 950,000 Argentine paper pesos command: 250 paper pesos equal to 100 gold pesos, the peso 22·4012 grains of gold, the pound 113·0016 grains of gold, the rate of exchange and charges $1\frac{1}{2}$ per cent. discount on the pounds?

XXVIII. The sum is—

$$\begin{aligned} ? \text{ (pounds)} &= 950,000 \text{ paper pesos} \\ \text{paper peso } 250 &= 100 \text{ gold pesos} \\ \text{gold peso } 1 &= 22\cdot4012 \text{ grains of gold} \\ \text{grains of gold } 113\cdot0016 &= 1 \text{ pound} \\ 100 &= 98\cdot5 \text{ discount on exchange} \end{aligned}$$

$$\frac{19\cdot000 \quad 1 \quad 2\cdot80015 \quad 19\cdot7}{\cancel{950000} \times \cancel{100} \times \cancel{22\cdot4012} \times 1 \times \cancel{98\cdot5}} = \text{£}74,200\cdot44. \text{—Ans.}$$

$$\frac{\cancel{100} \times 1 \times \cancel{113\cdot0016} \times \cancel{100} \times \cancel{100}}{\cancel{100} \quad 14\cdot12520 \quad 1}$$

EFFECT OF A COINAGE CHARGE.

The operation of a coinage charge in the foreign and colonial exchanges can be exemplified in the currency of British India as it existed in 1872. The normal state of British Indian trade and financial obligations has for many years been a vast excess of exportation of agricultural, mineral, and manufactured products over the imports, necessitating a steady importation of the precious metals into the country. There have been periods during the past fifty years, when silver has been exported to the West, but they have been rare, and of short duration. The coinage charge in British India was $2\frac{1}{3}$ per cent. This was a fixed charge adding to the sterling cost of the rupee, but not diminishing the rupee cost of the pound. Rupees received in the West would be procurable for remittance back to India, altering the rate of exchange by the charges upon the transaction.

What is the sterling cost of the rupee? The ratio between

the metals 15·64, the coinage charge $2\frac{1}{5}$ per cent., the rupee 165 grains of silver, and ·4708 of a grain of gold a penny.

XXIX. The sum is—

$$\begin{aligned} ? \text{ (pence)} &= 1 \text{ rupee} \\ \text{rupee } 1 &= 165 \text{ grains of silver} \\ \text{silver } 15\cdot64 &= 1 \text{ gold} \\ \cdot4708 &= 1 \text{ penny} \\ 100 &= 102\cdot2 \end{aligned}$$

$$\frac{1 \times \overset{33}{\cancel{165}} \times 1 \times 1 \times \overset{51\cdot1}{\cancel{165}}}{\cancel{15\cdot64} \times \cdot4708 \times \cancel{165}} = 22\cdot9 \text{ pence.—Ans.}$$

Without the coinage charge the sterling price of the rupee on the conditions given is 22·42 pence.

Cost with coinage.	Cost without coinage.
Pence = 22·9 rupee	Pence 22·42 = rupee
Rupee 10·47 = pound	Rupee 10·70 = pound

A few more instances for the traveller will be given, as these present a solution to the crux of the foreign and colonial exchanges of intermediaries.

VI.

INCONVERTIBLE PAPER BASED ON GOLD FOR INCONVERTIBLE PAPER BASED ON GOLD.

TRAVEL I.

The premium on gold in Spain is, say, 98 per cent. The peseta and the franc indicate the same weight of pure gold, viz. 4·4803 grains. What is the absolute par of exchange in Paris on these factors for, say, 986 pesetas in paper? The weights being the same, it is a percentage sum.

XXX. The sum is—

$$\begin{aligned} ? \text{ (gold francs)} &= 986 \text{ paper pesetas} \\ 98 \text{ per cent. paper pesetas } 198 &= 100 \text{ gold francs} \end{aligned}$$

$$\frac{\overset{493}{986} \times 100}{\underset{99}{98}} = 497\cdot97 \text{ gold francs.—Ans.}$$

Fixed gold pars.	98 per cent. premium on gold.
Franc 1 = 1 peseta	French cents $49\frac{1}{2}$ = 1 peseta
Peseta 1 = 1 franc	Spanish „ 198 = 1 franc

The standard money of account in the two Republics of the Argentine and Paraguay is a peso of 22·4012 grains of gold: the premium on gold in the Argentine Republic is 140 per cent.; in Paraguay it is 600 per cent. What is absolute par of exchange in the Argentine for 8600 Paraguay State paper notes?

XXXI. The sum is—

$$\begin{aligned} \text{? (Argentine paper pesos)} &= 8600 \text{ Paraguay paper pesos} \\ 600 \text{ per cent. premium } 700 &= 100 \text{ „ gold „} \\ \text{Argentine gold pesos } 100 &= 240 \text{ Argentine paper „} \end{aligned}$$

$$\begin{array}{r} 12 \\ 1 \quad 6\phi \\ 8600 \times \cancel{17\phi} \times \cancel{24\phi} \\ \hline 7\cancel{2\phi} \times \cancel{17\phi} \\ \cancel{17\phi} \\ 35 \end{array} = 2962\cdot85 \text{ paper pesos.—Ans.}$$

Fixed gold pars.

$$\begin{array}{l} \text{Argentine peso } 1 = 1 \text{ Paraguay peso} \\ \text{Paraguay „ } 1 = 1 \text{ Argentine „} \end{array}$$

$$\begin{array}{l} \text{Gold at 140 premium in Argentine Republic.} \\ \text{„ } 60 \text{ „ Paraguay „} \end{array}$$

$$\begin{array}{l} \text{Argentine paper cents } 34\cdot28 = 1 \text{ Paraguay paper peso} \\ \text{Paraguay paper peso } 2\cdot92 = 1 \text{ Argentine „ „} \end{array}$$

VII.

INCONVERTIBLE PAPER BASED UPON SILVER.

Until 1890, for the most part, Peru, Bolivia, Costa Rica, Ecuador, Salvador, United States of Columbia, Guatemala, Honduras, and Nicaragua, with a population of 13½ millions, had currencies consisting of inconvertible paper based upon silver. The standard of these countries was professedly either gold or silver, at the option of the payer, at the legislative ratio of 15·5 parts of silver to 1 part of gold. Since the heavy increase of the ratio of silver to 1 of gold, most of these countries have shifted the nominal basis of their inconvertible currency from silver to gold. The Peruvian weights are those of all the other countries except Bolivia. The weights are: the gold chief money of account, 22·40175 grains of gold. The silver in the coin of the same name, 347·2278 grains. The Bolivian new silver weight is 312·505046 troy grains of pure silver, and this

country has declared for and possesses, or is about to possess, an effective silver monetary system, making the second with Mexico, on the American Continent, which clings for the present to a silver standard.

Let us assume that one of these eight other countries possesses for its internal and international intermediary inconvertible paper based on silver.

VIII.

INCONVERTIBLE PAPER BASED ON SILVER FOR INCONVERTIBLE PAPER BASED ON GOLD.

TRAVEL I.

What amount of Argentine paper pesos at 140 per cent. premium on the gold peso would 1650 paper pesos command at 110 premium on the silver peso? Charge for the exchange 4 per cent. ratio between the metals 33·31. The gold peso 22·4017 grains of gold. The Columbian silver peso 347·2278 grains of silver.

XXXII. The sum is—

? (Argentine paper pesos) = 1650 paper peso on silver
 silver peso 1 = 347·2278 grains of silver
 grains of silver 33·31 = 1 grain of gold
 grains of gold 22·4017 = 1 gold peso
 Argentine premium 240 = 100
 100 = 210 silver premium
 100 = 96 discount or exchange

$$\frac{33}{1} \times \frac{173\cdot6139}{33\cdot31} \times \frac{1}{22\cdot4017} \times \frac{1}{347\cdot2278} \times \frac{1}{1} \times \frac{1}{1} \times \frac{1}{1} \times \frac{21}{1} \times \frac{96}{1} = 644\cdot94 \text{ paper pesos on gold.}$$

[—Ans.]

IX.

DIRECT AND INDIRECT EXCHANGES OF INTERMEDIARIES.

If a bill is bought at a discount upon fixed or absolute par of exchange of the day, it will appear in the buyer's chain at a premium equal to the discount, say discount of $2\frac{1}{2}$ per cent. $2\frac{1}{2}$ per cent. discount is equal to 2·58 per cent. premium; the chain in the buyer's sum would be $100 = 102\cdot58$.

If a bill is sold at a discount upon a fixed or absolute par of exchange of the day, it would appear in the seller's chain as at

the full discount, say discount $2\frac{1}{2}$ per cent. ; the chain would be $100 = 97.42$.

If a bill is bought at a premium on a fixed or absolute par of exchange, say $2\frac{1}{2}$ per cent., the buyer's link in the chain would be $100 = 102.5$.

If a bill sold at a premium on a fixed or absolute par of exchange, say $2\frac{1}{2}$ per cent., an equivalent discount to the premium would appear on the seller's link, thus $100 = 97.42$.

In Argentina and China the ratio between the metals may differ from that in London. Take 34.61 as the rate in Argentina and 31 in China. To bring these into the chain the gain in Argentina is 4.56 per cent., and the loss in China is 6.37 per cent. compared with London ; the links to be introduced would be—

$$\begin{aligned} 100 &= 104.56 \\ 100 &= 93.63 \end{aligned}$$

Indirect exchanges of intermediaries often yield a better result to the remitter than a direct exchange. By simultaneous purchases and sales in many different markets, or in a few different markets, this may be accomplished. It is desired to send a sum of money from the British Isles to India. The direct operation between London and Calcutta will be shown, and the indirect through the Argentine Republic and China will follow. Assume that the exchanges are for telegraph transfers. What will the pound yield in silver-cum-counter-charge rupees? The ratio between the metals, 33.31, the fictitious value of the silver rupee 50 per cent., the discount upon the sterling $2\frac{1}{2}$ per cent. The pound 113.0016 grains of gold. The rupee 165 grains of silver. Two and a half per cent. discount is equivalent to 2.58 per cent. premium to the buyer of the bill.

XXXIV. The sum is—

$$\begin{aligned} ? \text{ (fictitious silver rupee)} &= \text{£}1 \\ \text{£}1 &= 113.0016 \text{ grains of gold} \\ \text{grain of gold } 1 &= 33.1 \text{ grains of silver} \\ \text{grains of silver } 165 &= 1 \text{ silver rupee} \\ \text{premium on silver } 150 &= 100 \\ 100 &= 102.58 \end{aligned}$$

$$\frac{1 \times 113.0016 \times 33.31 \times 1 \times \cancel{100} \times 102.58}{1 \times 1 \times 165 \times 150 \times \cancel{100}} = 1.560 \text{ fictitious rupees.—Ans.}$$

The absolute par is obtained by leaving out the discount on par paid for the fictitious rupee. The par, Indian price, is 15·208 rupees for one pound.

The following is an arbitrated sum of exchange with telegraph transfers between the British Isles and British India through the Argentine Republic and China, which embraces the world's present great diverse intermediaries, namely, automatic gold, automatic silver, silver-cum-counter-charge, and inconvertible paper based on gold. The paper price of gold in the Argentine is 140 per cent. premium. China's intermediary is automatic silver. A remitter in London pays for a telegraph transfer upon Rosario $2\frac{1}{2}$ per cent. dis., equal to 2.58 premium to him for paper at 140 per cent. premium on gold; his agent in Rosario invests the proceeds at the same premium in a T.T. on China at 6 per cent. discount, equal to 6.38 per cent. premium: his agent in China invests the proceeds in a T.T. on Calcutta at 1 per cent. premium, equal to 1 per cent. discount. The ratio between gold and silver 33.31 the same in London, Rosario, Shanghai, and Calcutta. How does this circuitous remittance compare with the direct one?

XXXV. The sum is—

? (fictitious silver rupee) = £1

£1 = 113.0016 grains of gold

grains of gold 1 = 33.31 grains of silver

grams of silver 165 = 1 silver rupee

premium on silver $150 = 100$

100 = 102.58 discount in London

paper premium in London $\frac{240}{200} = 100$

$$100 = 240 \text{ paper premium in Rosario}$$

100 = 106.38 discount on Rosario

100 = 99 premium in Shanghai

$$\frac{1 \times \cancel{1} \times \cancel{2} \times \cancel{3} \times \cancel{4} \times 33 \cdot 31 \times 1 \times \cancel{1} \times \cancel{2} \times \cancel{3} \times 102 \cdot 58 \times \cancel{1} \times \cancel{2} \times \cancel{3} \times \cancel{4} \times \cancel{5} \times \cancel{6} \times \cancel{7} \times \cancel{8} \times \cancel{9}}{0 \times 1 \times \cancel{1} \times \cancel{2} \times \cancel{3} \times \cancel{4} \times \cancel{5} \times \cancel{6} \times \cancel{7} \times \cancel{8} \times \cancel{9} \times \cancel{10} \times \cancel{11} \times \cancel{12} \times \cancel{13} \times \cancel{14} \times \cancel{15} \times \cancel{16} \times \cancel{17} \times \cancel{18} \times \cancel{19} \times \cancel{20}} = \begin{cases} 16 \cdot 43 & \text{fictitious} \\ \text{rupees.} \\ \text{—Ans.} \end{cases}$$

The result of the circuitous course of exchange, compared with the direct, shows that there is a gain by the former over the latter of 5.32 per cent. By deducting the percentage premium from the percentage discounts, 5 per cent. is shown. The addi-

tional 32 per cent. gain results from the treatment of the discounts as premium and the premium as a discount, together with the increased or decreased amount at each stage of the operation. The weight of silver for the weight of gold once stated in this operation, it was needless to introduce it into the sum, as also it is needless to have introduced the premium in paper on gold in the Argentine, the premium being taken in London and in Rosario at the same rate. The fifteen variable factors which could be introduced into a circuitous bill operation through countries using the four intermediaries embraced in the foregoing operation are for the three bills. Credit 3 classes of. Usance, from sight to 6 months' sight, 3; local rates of discount, 3; altered ratio between gold and silver, 2; paper premium on gold, 2; fictitious value of silver, 2. It will be noticed that nine out of these variable factors would play their part in the exchange even though an effective metal monetary system on one metal existed in the four countries.

The absolute par of exchange in this arbitrated sum of exchanges is 15.208 rupees for one pound. The percentages for charges resulting from various causes upon this sum at various stages of the operations, added or deducted, brings out the same result as the chain rule sum, thus—

$$15.208 + 2.58 \text{ per cent.} + 6.38 \text{ per cent.} - 1 \text{ per cent.} = 16.43 \text{ rupees.}$$

To reach the absolute par there are three variable factors, X, variable rates between the metals. Y, variable bounty upon silver conferred by legislation. Z, variable inconvertible paper premium upon gold. Under X we are dealing with substances, weights, real and only money. In teaching it is all important that the naked weights of money should be pressed home upon the minds of the taught. The other two factors can be dealt with in the shape of premium or discount upon weights of money. Besides fixed and absolute pars there are percentage more or less charges upon such pars resulting from—different credit, different usance of bills, different local rates of discount, coinage charge, transmission of metal charge, and commission where an agent is employed. To these last we attach the sign ϕ .

Such a chain rule sum as that illustrated, but with all possible variations, might be presented thus:—

?	(fictitious silver rupees)	=	£1
		£1	= 113·0016 grains of gold
in London grain of gold	1	=	33·31 grains of silver X
	grains of silver	165	= 1 rupee
Z Indian legislative premium	150	=	100
2½ per cent. discount in London	100	=	102·58 in Argentine φ
Z Argentine paper premium	240	=	100 in London
Z Argentine paper premium	100	=	238 in Argentine
X ratio of silver to gold	1·8 per cent. }	100	= 101·8 in Argentine
	premium 33·31 }		
discount in Argentine upon China	100	=	106·38 premium φ
1 per cent. premium in Shanghai on India	100	=	99 discount φ

With this instruction and examples every youth, before finishing scholastic education, should have perfect command over the forty-nine different currency exchanges at present existing in the world.

Every properly educated person should possess a theoretical and arithmetical knowledge of the world's present mechanism of the interchanges of things. This knowledge is the safe foundation on which to erect the science of money. In 1883, on the recommendation of the late Professor Stanley Jevons, I procured a copy of "Money" by the late Professor F. A. Walker. Jevons recommended the work as the best authority upon money. The perusal of it was a great disappointment to me. I consider the instruction in it springs from an entire misconception of what money is, and that it is the worst guide to the subject that has ever been written since John Locke's time. Anything and everything which, under certain conditions, does the work of money he says is money—a fundamental error from which is born all the wild, impracticable schemes of currency which ceaselessly flow from uninstructed or disordered brains. In the early years of this decade, being convinced of the great importance of true definitions upon such a vastly important subject as money, I formulated, and have ever since most persistently held, that the absolutely correct definition of money is "The standard substance in the shape of bullion and coin appropriated to currency purposes." This little work most clearly and prominently shows that credit instruments,

that is, from a book debt to a State bank-note, is not money; that no description of token is money; that a coinage charge, a counter charge, a premium on the standard substance conferred by inconvertible paper, are not money. It is conclusively shown that all money is currency, but that all currency is not money. I desire to indelibly fix this truth on mankind. As soon as I possessed this profound conviction I mentioned my definition to two professional economists, one in England, the other in Ireland. I could not forbear from telling them that in my humble judgment I did not think they would ever understand money, or teach it properly, till they accepted my definition. They neither of them could see it. I have been led to study, compare, and write upon Archbishop Whately's "Easy Lessons on Money Matters for the Use of Young People," produced in the forties of this century, and Professor Jevons' "Political Economy," a Science Primer edited by Professors Huxley, Roscoe, and Balfour Stewart in 1878. I consider the earlier writer the sounder of the two. The first authority makes money his first subject, the second his twelfth. These pages contain the foundation to topstone of my work upon the exchanges. They should gain the attention of all students of sociology. They also form an appropriate Christmas gift to any boy or girl whose interest is awakened as to what money is and how it does its work. May it help forward, and that soon, the appearance of a popular lecturer upon this vastly important subject of money. I shall esteem it a favour if any discovery of error in the pamphlet is at once communicated to me.

FIXED GOLD AND SILVER PARS.

It is absolutely requisite to work the exchanges of intermediaries in decimals of weights of standard substances or of monetary signs. To secure perfect accuracy in large transactions, work done in six decimal places is requisite. At present fractions are largely, if not exclusively, used. Take two illustrations from the British monetary system and use. The bases of the exchanges in the British Isles is the sovereign 113·001605 troy grains of pure gold. The nearest fraction to ·001605 is $\frac{1}{512}$ ths of one grain, the decimal for which is ·0019531. The British monetary sign for the mint issue weight of pure gold in the French franc is 9·515688 pence. The nearest fraction to ·515688 is $\frac{3}{64}$ ths, which is ·515625. Take the French monetary sign for the mint issue weight of the sovereign, 25f. 22·15328c.; the nearest fraction to ·15328 is $\frac{5}{32}$ nds, which is ·15625.

FIXED GOLD PARS OF EXCHANGE.

No. 1.—EGYPTIAN PIASTRES FOR

	Piastres.		Piastres.
1. British pound . . .	98·452	9. Japanese yen . . .	10·084
2. Turkish pound . . .	88·936	10. Dutch guilder . . .	8·131
3. Portuguese milrei . . .	21·858	11. Chilian condor . . .	7·384
4. Uruguay peso . . .	20·923	12. British Indian rupee . . .	6·563
5. U.S.A. dollar . . .	20·230	13. Scandinavian crown . . .	5·421
6. Argentine peso . . .	19·517	14. German mark . . .	4·819
7. Brazilian milrei . . .	11·049	15. Aus.-Hungarian crown . . .	4·099
8. Russian rouble . . .	10·408	16. French franc . . .	3·903

No. 2.—BRITISH PENCE FOR

	Pence.		Pence.
1. Egyptian pound . . .	243·768	9. Japanese yen . . .	24·582
2. Turkish pound . . .	216·803	10. Dutch guilder . . .	19·823
3. Portuguese milrei . . .	53·284	11. Chilian condor . . .	17·999
4. Uruguay peso . . .	51·004	12. British Indian rupee . . .	16·000
5. U.S.A. dollar . . .	49·316	13. Scandinavian crown . . .	13·216
6. Argentine peso . . .	47·578	14. German mark . . .	11·747
7. Brazilian milrei . . .	26·934	15. Aus.-Hungarian crown . . .	9·992
8. Russian rouble . . .	25·372	16. French franc . . .	9·515

No. 3.—TURKISH PIASTRES FOR

	Piastres.		Piastres.
1. Egyptian pound . . .	112.439	9. Japanese yen . . .	11.338
2. British pound . . .	110.699	10. Dutch guilder . . .	9.143
3. Portuguese milrei . . .	24.577	11. Chilian condor . . .	8.302
4. Uruguay peso . . .	23.525	12. British Indian rupee . . .	7.380
5. U.S.A. dollar . . .	22.746	13. Scandinavian crown . . .	6.096
6. Argentine peso . . .	21.945	14. German mark . . .	5.418
7. Brazilian milrei . . .	12.423	15. Aus.-Hungarian crown . . .	4.609
8. Russian rouble . . .	11.703	16. French franc . . .	4.389

No. 4.—PORTUGUESE REIS FOR

	Reis.		Reis.
1. Egyptian pound . . .	457.493	9. Japanese yen . . .	461.34
2. British pound . . .	450.412	10. Dutch guilder . . .	372.02
3. Turkish pound . . .	406.879	11. Chilian condor . . .	337.81
4. Uruguay peso . . .	95.721	12. British Indian rupee . . .	300.27
5. U.S.A. dollar . . .	92.552	13. Scandinavian crown . . .	248.03
6. Argentine peso . . .	89.291	14. German mark . . .	220.47
7. Brazilian milrei . . .	50.549	15. Aus.-Hungarian crown . . .	187.53
8. Russian rouble . . .	47.617	16. French franc . . .	178.58

No. 5.—URUGUAYAN CENTESIMOS FOR

	Centesimos.		Centesimos.
1. Egyptian pound . . .	477.94	9. Japanese yen . . .	48.19
2. British pound . . .	470.54	10. Dutch guilder . . .	38.86
3. Turkish pound . . .	425.08	11. Chilian condor . . .	35.29
4. Portuguese milrei . . .	104.47	12. British Indian rupee . . .	31.37
5. U.S.A. dollar . . .	96.69	13. Scandinavian crown . . .	25.91
6. Argentine peso . . .	93.28	14. German mark . . .	23.03
7. Brazilian peso . . .	52.81	15. Aus.-Hungarian crown . . .	19.59
8. Russian rouble . . .	49.74	16. French franc . . .	18.65

No. 6.—UNITED STATES AMERICA CENTS FOR

	Cents.		Cents.
1. Egyptian pound . . .	494.307	9. Japanese yen . . .	49.846
2. British pound . . .	486.656	10. Dutch guilder . . .	40.196
3. Turkish pound . . .	439.620	11. Chilian condor . . .	36.50
4. Portuguese milrei . . .	108.047	12. British Indian rupee . . .	32.443
5. Uruguay peso . . .	103.424	13. Scandinavian crown . . .	26.798
6. Argentine peso . . .	96.476	14. German mark . . .	23.821
7. Brazilian milrei . . .	54.616	15. Aus.-Hungarian crown . . .	20.262
8. Russian rouble . . .	51.449	16. French franc . . .	19.295

No. 7.—ARGENTINE CENTAVOS FOR

	Centavos.		Centavos.
1. Egyptian pound . . .	512·361	9. Japanese yen . . .	51·666
2. British pound . . .	504·431	10. Dutch guilder . . .	41·664
3. Turkish pound . . .	455·677	11. Chilian condor . . .	37·832
4. Portuguese milrei . . .	111·993	12. British Indian rupee . . .	33·628
5. Uruguay peso . . .	107·201	13. Scandinavian crown . . .	27·777
6. U.S.A. dollar . . .	103·652	14. German mark . . .	24·691
7. Brazilian milrei . . .	56·611	15. Aus.-Hungarian crown . . .	21·002
8. Russian rouble . . .	53·328	16. French franc . . .	20·000

No. 8.—BRAZILIAN REIS FOR

	Reis.		Reis.
1. Egyptian pound . . .	9050·48	9. Japanese yen . . .	912·65
2. British pound . . .	8910·40	10. Dutch guilder . . .	735·96
3. Turkish pound . . .	8049·20	11. Chilian condor . . .	668·279
4. Portuguese milrei . . .	1978·27	12. British Indian rupee . . .	594·02
5. Uruguay peso . . .	1893·63	13. Scandinavian crown . . .	490·67
6. U.S.A. dollar . . .	1830·94	14. German mark . . .	436·15
7. Argentine peso . . .	1766·42	15. Aus.-Hungarian crown . . .	370·99
8. Russian rouble . . .	942·00	16. French franc . . .	353·28

No. 9.—RUSSIAN COPECKS FOR

	Copecks.		Copecks.
1. Egyptian pound . . .	960·767	9. Japanese yen . . .	96·884
2. British pound . . .	945·896	10. Dutch guilder . . .	78·127
3. Turkish pound . . .	854·475	11. Chilian condor . . .	70·942
4. Portuguese milrei . . .	210·007	12. British Indian rupee . . .	63·059
5. Uruguay peso . . .	201·021	13. Scandinavian crown . . .	52·088
6. U.S.A. dollar . . .	194·366	14. German mark . . .	46·300
7. Argentine peso . . .	187·517	15. Aus.-Hungarian crown . . .	39·383
8. Brazilian milrei . . .	106·156	16. French franc . . .	37·503

No. 10.—JAPANESE SENS FOR

	Sens.		Sens.
1. Egyptian pound . . .	991·666	9. Russian rouble . . .	103·216
2. British pound . . .	976·317	10. Dutch guilder . . .	80·640
3. Turkish pound . . .	881·955	11. Chilian condor . . .	73·223
4. Portuguese milrei . . .	216·761	12. British Indian rupee . . .	65·087
5. Uruguay peso . . .	207·486	13. Scandinavian crown . . .	53·763
6. U.S.A. dollar . . .	200·617	14. German mark . . .	47·789
7. Argentine peso . . .	193·548	15. Aus.-Hungarian crown . . .	40·650
8. Brazilian milrei . . .	109·570	16. French franc . . .	33·709

No. 11.—DUTCH CENTS FOR

	Cents.		Cents.
1. Egyptian pound .	1229·745	9. Russian rouble .	127·996
2. British pound .	1210·711	10. Japanese yen .	124·008
3. Turkish pound .	1093·695	11. Chilian condor .	90·803
4. Portuguese milrei .	268·801	12. British Indian rupee .	80·714
5. Uruguay peso .	257·299	13. Scandinavian crown .	66·670
6. U.S.A. dollar .	248·781	14. German mark .	59·262
7. Argentine peso .	240·015	15. Aus.-Hungarian crown .	50·409
8. Brazilian milrei .	135·876	16. French franc .	48·003

No. 12.—CHILIAN CENTAVOS FOR

	Centavos.		Centavos.
1. Egyptian pound .	1354·296	9. Russian rouble .	140·959
2. British pound .	1333·334	10. Japanese yen .	136·567
3. Turkish pound .	1204·466	11. Dutch guilder .	110·128
4. Portuguese milrei .	296·025	12. British Indian rupee .	88·888
5. Uruguay peso .	283·359	13. Scandinavian crown .	73·423
6. U.S.A. dollar .	273·978	14. German mark .	65·265
7. Argentine peso .	264·324	15. Aus.-Hungarian crown .	55·515
8. Brazilian milrei .	149·638	16. French franc .	52·865

No. 13.—BRITISH INDIAN RUPEES AND ANNAS FOR

	Rupees.		Rupees.
1. Egyptian pound .	15·23582	10. Japanese yen .	1·536385
2. British pound .	15·	11. Dutch guilder .	1·238941
3. Turkish pound .	13·55024	12. Chilian condor .	1·124999
4. Portuguese milrei .	3·33028		Annas.
5. Uruguay .	3·187793	13. Scandinavian .	13·216
6. U.S.A. dollar .	3·082257	14. German mark .	11·747
7. Argentine peso .	2·973649	15. Aus.-Hungarian crn. .	10·022
8. Brazilian milrei .	1·683426	16. French franc .	9·515
9. Russian rouble .	1·585797		

No. 14.—SCANDINAVIAN CROWNS AND ORES FOR

	Crowns.		Crowns.
1. Egyptian pound .	18·445	10. Japanese yen .	1·86
2. British pound .	18·15951	11. Dutch guilder .	1·499904
3. Turkish pound .	16·40437	12. Chilian condor .	1·361962
4. Portuguese milrei .	4·031757	13. British Indian rupee .	1·210634
5. Uruguay peso .	3·85925		Ores.
6. U.S.A. dollar .	3·731485	14. German mark .	88·8887
7. Argentine peso .	3·6	15. Aus.-Hungarian crn. .	75·6097
8. Brazilian milrei .	2·038012	16. French franc .	72·0000
9. Russian rouble .	1·919819		

No. 15.—GERMAN MARKS AND PFENNIGS FOR

	Marks.		Marks.
1. Egyptian pound .	20·75066	10. Japanese yen .	2·092503
2. British pound .	20·42948	11. Dutch guilder .	1·687395
3. Turkish pound .	18·45495	12. Chilian condor .	1·532210
4. Portuguese milrei .	4·535733	13. British Indian rupee .	1·361965
5. Uruguay peso .	4·341662	14. Scandinavian crown .	1·125002
6. U.S.A. dollar .	4·197927		Pfennigs.
7. Argentine peso .	4·050006	15. Aus.-Hungarian em. .	85·06111
8. Brazilian milrei .	2·292767	16. French franc .	81·00012
9. Russian rouble .	2·159800		

No. 16.—AUSTRIA-HUNGARIAN CROWNS AND HELLERS FOR

	Crowns.		Crowns.
1. Egyptian pound .	24·395	10. Japanese yen .	2·46
2. British pound .	24·01741	11. Dutch guilder .	1·983744
3. Turkish pound .	21·69611	12. Chilian condor .	1·801305
4. Portuguese milrei .	5·332323	13. British Indian rupee .	1·601161
5. Uruguay peso .	5·104169	14. Scandinavian crown .	1·322581
6. U.S.A. dollar .	4·935189	15. German mark .	1·175625
7. Argentine peso .	4·761290		Hellers.
8. Brazilian milrei .	2·695436	16. French franc .	95·22581
9. Russian rouble .	2·539116		

No. 17.—FRENCH FRANCS FOR

	Francs.		Francs.
1. Egyptian pound .	25·61806	9. Russian rouble .	2·666415
2. British pound .	25·22154	10. Japanese yen .	2·583333
3. Turkish pound .	22·78885	11. Dutch guilder .	2·0832
4. Portuguese milrei .	5·599662	12. Chilian condor .	1·891614
5. Uruguay peso .	5·360069	13. British Indian rupee .	1·684136
6. U.S.A. dollar .	5·182618	14. Scandinavian crown .	1·388889
7. Argentine peso .	5·	15. German mark .	1·234566
8. Brazilian milrei .	2·830573	16. Aus.-Hungarian crown .	1·050136

FIXED SILVER PARS OF EXCHANGE.

No. 1.—SHANGHAE CASH FOR

	Cash.		Cash.
1. Mexican peso .	730·39	7. Russian rouble .	537·80
2. Japanese yen .	725·01	8. Siamese tical .	438·23
3. Javanese rixdollar .	706·01	9. Austrian florin .	332·04
4. Philippine dollar .	698·21	10. British Indian rupee .	319·51
5. Columbian sol .	672·39	11. Persian kran .	123·81
6. Bolivian boliviano .	605·15		

No. 2.—MEXICAN CENTAVOS FOR

	Centavos.		Centavos.
1. Shanghae tael . .	136·81	7. Russian rouble . .	73·63
2. Japanese yen . .	99·26	8. Siamese tical . .	60·00
3. Javanese rixdollar . .	96·66	9. Austrian florin . .	45·46
4. Philippine dollar . .	95·59	10. British Indian rupee . .	43·74
5. Columbian sol . .	92·06	11. Persian kran . .	16·95
6. Bolivian boliviano . .	82·85		

No. 3.—JAPANESE SENS FOR

	Sens.		Sens.
1. Shanghae tael . .	137·92	7. Russian rouble . .	74·17
2. Mexican peso . .	100·74	8. Siamese tical . .	60·45
3. Javanese rixdollar . .	97·38	9. Austrian florin . .	45·80
4. Philippine dollar . .	96·30	10. British Indian rupee . .	44·07
5. Columbian sol . .	92·74	11. Persian kran . .	17·07
6. Bolivian boliviano . .	83·46		

No. 4.—JAVANESE CENTS FOR

	Cents.		Cents.
1. Shanghae tael . .	141·64	7. Russian rouble . .	76·17
2. Mexican peso . .	103·45	8. Siamese tical . .	62·07
3. Japanese yen . .	102·69	9. Austrian florin . .	47·03
4. Philippine dollar . .	98·89	10. British Indian rupee . .	45·25
5. Columbian sol . .	95·23	11. Persian kran . .	17·53
6. Bolivian boliviano . .	85·71		

No. 5.—PHILIPPINE CENTAVOS FOR

	Centavos.		Centavos.
1. Shanghae tael . .	143·22	7. Russian rouble . .	77·02
2. Mexican peso . .	104·61	8. Siamese tical . .	62·76
3. Japanese yen . .	103·84	9. Austrian florin . .	47·55
4. Javanese rixdollar . .	101·11	10. British Indian rupee . .	45·76
5. Columbian sol . .	96·30	11. Persian kran . .	17·73
6. Bolivian boliviano . .	86·67		

No. 6.—COLUMBIAN CENTESIMOS FOR

	Centesimos.		Centesimos.
1. Shanghae tael . .	148·72	7. Russian rouble . .	79·98
2. Mexican peso . .	108·62	8. Siamese tical . .	65·17
3. Japanese yen . .	107·82	9. Austrian florin . .	49·38
4. Javanese rixdollar . .	105·00	10. British Indian rupee . .	47·52
5. Philippine dollar . .	103·84	11. Persian kran . .	18·41
6. Bolivian boliviano . .	90·00		

No. 7.—BOLIVIAN CENTESIMOS FOR

	Centesimos.		Centesimos.
1. Shanghae tael . . .	165.24	7. Russian rouble . . .	88.87
2. Mexican peso . . .	120.69	8. Siamese tical . . .	72.42
3. Japanese yen . . .	119.80	9. Austrian florin . . .	54.87
4. Javanese rixdollar . . .	116.66	10. British Indian rupee . . .	52.80
5. Philippine dollar . . .	115.38	11. Persian kran . . .	20.46
6. Columbian sol . . .	111.11		

No. 8.—RUSSIAN COPECKS FOR

	Copecks.		Copecks.
1. Shanghae tael . . .	185.94	7. Bolivian boliviano . . .	112.52
2. Mexican peso . . .	135.81	8. Siamese tical . . .	81.49
3. Japanese yen . . .	134.81	9. Austrian florin . . .	61.74
4. Javanese rixdollar . . .	131.28	10. British Indian rupee . . .	59.41
5. Philippine dollar . . .	129.83	11. Persian kran . . .	23.02
6. Columbian sol . . .	125.03		

No. 9.—SIAMESE TICALS AND PHAI-NUNGS FOR

	Ticals.		Ticals.
1. Shanghae tael . . .	2.2818	7. Bolivian boliviano . . .	1.3809
2. Mexican peso . . .	1.6666	8. Russian rouble . . .	1.2272
3. Japanese yen . . .	1.6543		Shahis.
4. Javanese rixdollar . . .	1.6110	9. Austrian florin . . .	15.1536
5. Philippine dollar . . .	1.5932	10. British Indian rupee . . .	14.5818
6. Columbian sol . . .	1.5343	11. Persian kran . . .	5.7032

No. 10.—AUSTRIAN FLORINS AND KREUTZERS FOR

	Florins.		Florins.
1. Shanghae tael . . .	3.0116	7. Bolivian boliviano . . .	1.8225
2. Mexican peso . . .	2.1996	8. Russian rouble . . .	1.6196
3. Japanese yen . . .	2.1334	9. Siamese tical . . .	1.3198
4. Javanese rixdollar . . .	2.1262		Krentzers.
5. Philippine dollar . . .	2.1027	10. British Indian rupee . . .	96.226
6. Columbian sol . . .	2.025	11. Persian kran . . .	37.286

No. 11.—BRITISH INDIAN RUPEES AND ANNAS FOR

	Rupees.		Rupees.
1. Shanghae tael . . .	3.1297	7. Bolivian boliviano . . .	1.8939
2. Mexican peso . . .	2.2859	8. Russian rouble . . .	1.6831
3. Japanese yen . . .	2.2691	9. Siamese tical . . .	1.3715
4. Javanese rixdollar . . .	2.2096	10. Austrian florin . . .	1.0392
5. Philippine dollar . . .	2.1852		Annas.
6. Columbian sol . . .	2.1044	11. Persian kran . . .	6.1998

No. 12.—PERSIAN KRANS FOR

	Krans.		Krans.
1. Shanghai tael . . .	8.0769	7. Bolivian boliviano . . .	4.8878
2. Mexican peso . . .	5.8993	8. Russian rouble . . .	4.3437
3. Japanese yen . . .	5.8588	9. Siamese tical . . .	3.5396
4. Javanese rixdollar . . .	5.7024	10. Austrian florin . . .	2.6819
5. Philippine dollar . . .	5.6394	11. British Indian rupee . . .	2.5807
6. Columbian sol . . .	5.4308		

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